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Hugh Cumming, CIO for ADP Employer Services Canada, says that to fix the requirements mess, CIOs need to take a leadership position and learn to say no—or at least not yet—to business requests.

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content

NOVEMBER/15/2005 | VOL/19 | NO/4

“The list of people who would have the most to contribute to a requirements list always ends up being small in my experience.”

—HUGH CUMMING,
CIO OF ADP EMPLOYER
SERVICES CANADA

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Software and Systems

COVER STORY | FIXING THE REQUIREMENTS MESS | 52

The requirements process—literally, deciding what should be included in software—is destroying projects in ways that aren’t evident until it’s too late. Some CIOs are stepping in to rewrite the rules. **Feature by Christopher Lindquist**

INSIDE THE SOFTWARE TESTING QUAGMIRE | 38

Software testing reveals the human failings behind the code. That’s why it can become a never-ending exercise in denial. Here are five questions CIOs can ask to cut through to testing’s root problems. **Column by Paul Garbaczski**

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Next to requirements, testing is the most overlooked, most underfunded, most rushed, yet most critical aspect of the software development cycle. Here are 11 ways to boost the level of success. **Feature by Meridith Levinson**

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After an initial outsourcing attempt failed, **Farrell Delman**, CIO of the Tobacco Merchants Association, succeeded in his second attempt because he allowed time for his company and its outsourcer to learn one another's capabilities and needs.

IT Value

KEEPING UP WITH THE MERRILL LYNCHES | 68

The CEO of The Options Clearing Corp. knows his company lives or dies by the strength of its IT. Maybe that's why he isn't so hung up on cutting costs and hitting deadlines.

A View from the Top interview by Ben Worthen

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When client and vendor jointly manage a project, especially when the vendor is offshore, success requires CIO oversight and strong capabilities from both sides. **Feature** by Stephanie Overby

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One of the most important things CIOs can create is the right mix of healthy environment and reliable process in order to foster innovation. **Column** by Michael Schrage

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Wh@t's Hot Online

Read more about the original research conducted by MIT's Center for Information Systems Research and CIO in our online **SPECIAL REPORTS** section. You'll also find reports on the Balanced Scorecard, running IT like a business, grid computing and much more. Go to www.cio.com/specialreports.





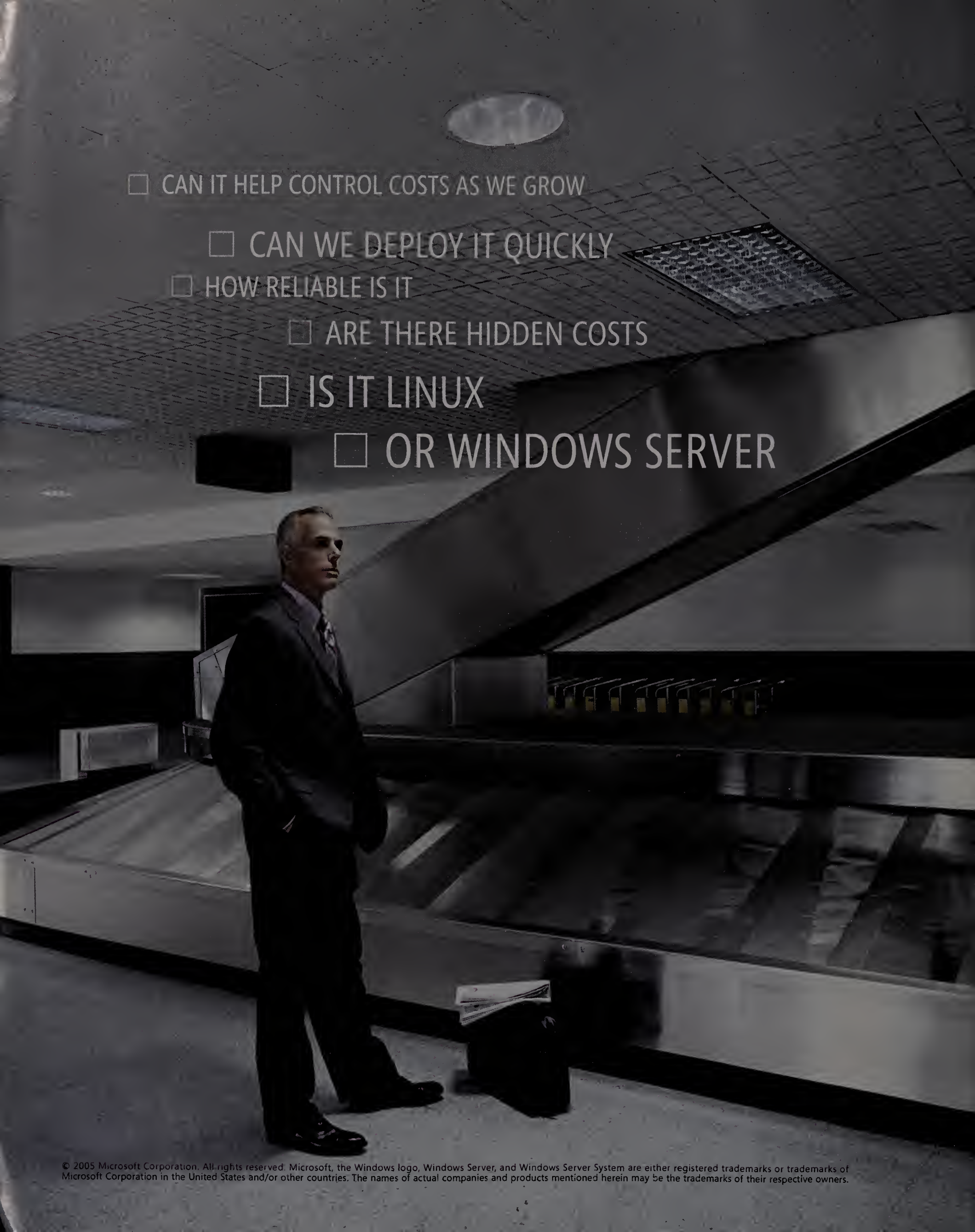
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A man in a dark suit and tie stands in profile, looking out a large window. He is holding a briefcase in his right hand. The office is modern with a large window and a desk. The ceiling has a grid pattern with a circular light fixture. The overall tone is professional and contemplative.

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—Rick Dempsey, Chief Information Officer, Rayovac



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The Most Important Skill

The long-standing debate over whether schools should stress technology or business, theory or practice, may be missing the point. The key skill to teach is always communication.

I'm participating in a panel discussion on the future of IT education at one of our local business schools this week. I've been asked to bring the industry perspective: What do real organizations really need their IT professionals to know?

This discussion has been going on for some time now within both the academic and business communities, and it typically revolves around the question of how much technology knowledge should be taught in the schools versus general business knowledge and management skills. Clearly this is not an either/or question; good IT professionals need both, and everyone knows that. It's more a question of proportion (how much technology, how much business management) and philosophy (how much theory, how much practice).

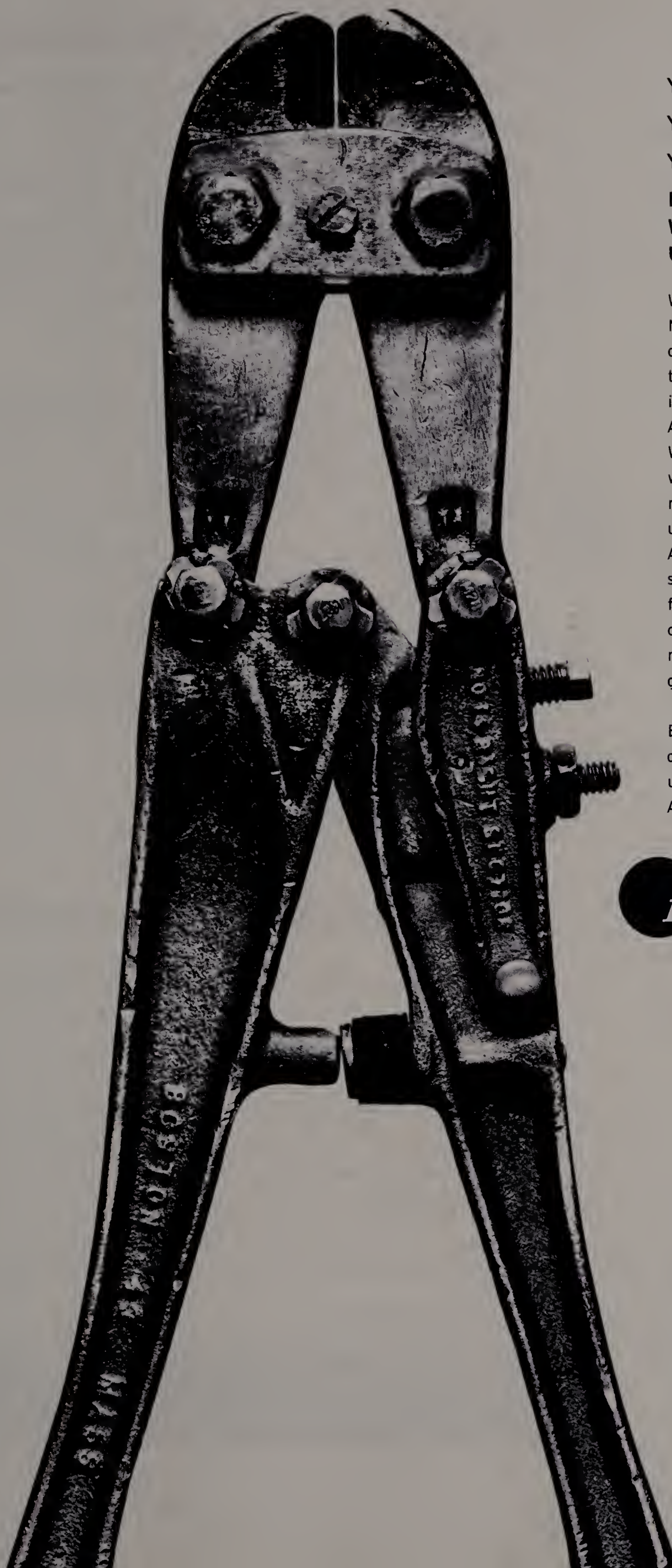
It seems to me that the issue of requirements definition and management—whether for system capabilities or for broader sets of project specs—offers some pertinent lessons that may not resolve but at least clarify this debate. For instance, in our cover story, “Fixing the Requirements Mess” on Page 52, Technology Editor Christopher Lindquist reports that 70 percent of software project failure can be attributed to poor requirements management. Seventy percent! That means that if only people were able to agree to what, precisely and minimally, they need a system to do and to stick to it, there would be 70 percent fewer software project failures, even if nothing were done to improve bad code or poor project- or change-management discipline. This is astonishing.

And in “Offshore Allies,” Page 74, the second of a three-part series on outsourcing strategies and models, Senior Editor Stephanie Overby reports that 37 percent of co-sourcing arrangements (in which clients and vendors share management responsibilities for application project initiatives) end in failure. According to research jointly conducted by MIT's Center for Information Systems Research (CISR) and *CIO*, to be successful in this type of arrangement, each party must play to its strengths (business knowledge on the client side; technical expertise on the part of the vendor), set up the relationship so those capabilities can mesh well, and define the separate contributions of each as clearly as possible without detracting from the collaborative effort. “The lesson I've learned with any partner is that being very formal in the communication process and setting expectations clearly up front is paramount to success,” says Michael Agnew, managing director of project management at software provider Omgeo. “All throughout the project lifecycle, it should be clear who's handling what. There needs to be clear accountability.”

There are certainly frameworks and methodologies that universities could teach to help future IT professionals be more successful in managing requirements and expectations. But what would be truly transformative would be for all educators—from kindergarten through college and right into the workplace—to teach people how to communicate clearly, to define, precisely and minimally, what they need (from a system or anything else) or expect (from a partner or employee—or a child or spouse, for that matter). These types of fundamental and enduring skills would go a long way to improving the state of business overall.

A handwritten signature in dark ink, reading "Abbie Lundberg". The signature is fluid and cursive, with a large, stylized 'A' and 'L'.

Abbie Lundberg, Editor in Chief
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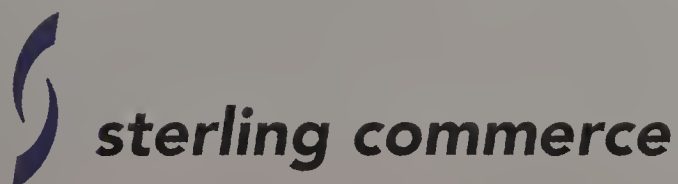
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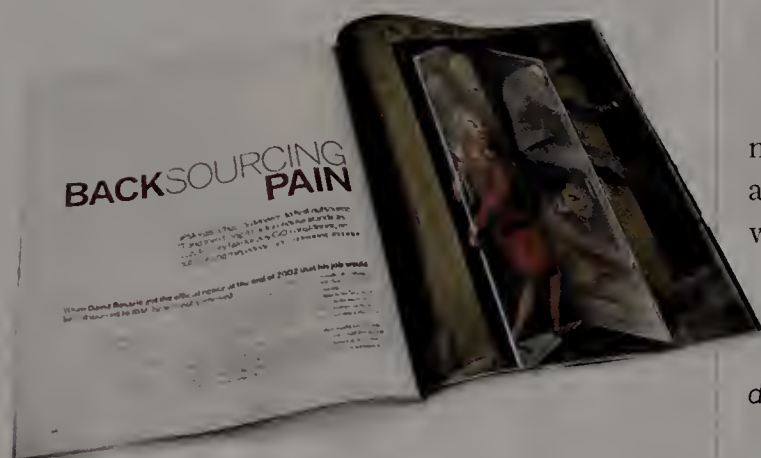
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InBox



Put an Exit Strategy in the Contract

The best practices mentioned in “Backsourcing Pain” [Sept. 1] may help minimize the backlash that will accompany JPMorgan Chase’s transfer of work back home. My question is, why was the possibility of change not considered when the contract was set up?

In the fluid environment that is outsourcing, it is naive to assume that all will go well every time. There are too many players, too many opportunities to do things differently on both ends, and it is too difficult to convince the staff back home to accept backsourcing if the option hasn’t been on the table from the beginning.

The disaster in New Orleans, caused by an uncontrollable source, the weather, is evidence that an exit strategy must be well-defined and can’t consist simply of a “can’t happen here” mind-set.

As a pilot, I planned for and documented each flight and thought up alternatives if weather, equipment failure or customer illness occurred. For hundreds of flights, nothing triggered the alternate plan. But for the one that did—well, enough said.

Nobody likes to be the person bringing up the downside of a new approach to business. But management must consider and then track the conditions that indicate it’s time for change. I understand why companies do not like to create exit strategy plans. They take time, effort and

money to prepare. But should the need arise to activate the plan, the savings are well worth the effort.

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Lessons Never Learned

It seems that CXOs never learn the painful lessons of outsourcing. Case in point: JPMorgan and IBM, EDS and GM, and many other highly publicized outsourcing deals gone south.

It is obvious that outsourcing is upper management’s tool to make financial gains in the short term. However, the long-term financial operational gains are disastrous, employee morale is destroyed, trust in management is lost, and an entire gamma of negative issues result from the outsourcing deal.

Outsourcing has never been a panacea for mismanagement of the IT function, and the examples of such deals are plenty around us. Instead of outsourcing, companies need to evaluate what has worked within their IT organizations and apply the same principles in those areas where they are lacking resources, experience or knowledge. Implement an ongoing program for process improvement and constantly evaluate the outcomes of strategic and corporate decisions.

There is an old saying: The wishbone will never replace the backbone. That seems to be true with outsourcing. Many high-level managers wish that outsourcing would replace a well-structured and strategic management plan. That will never happen.

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A Supplement to Good IT Health

One reason outsourcing looks so attractive to management is that it’s difficult to quantify lost productivity that results from outsourcing. Suddenly, it takes longer to do any project because of negotiation or translation issues.

Additionally, management is typically too isolated in the ivory tower to really understand the true impact of outsourcing. I worked for a company years ago that outsourced its infrastructure support to a large vendor. I joined the company as a senior consultant and had to wait two and a half weeks to get a network log-in ID. I found out that was a common experience with new employees. How much of the company’s savings was spent paying me to sit around mostly unable to work?

If outsourcing costs only a 10 percent reduction (a conservative estimate), multiply that times the burdened cost of your workforce. Are you truly saving anything?

I have a motto relative to outsourcing: “Nobody cares about you like you.” Despite all the promises in the world made by salespeople, it’s not their business that’s at stake, and they’re not personally vested in its outcome.

My experience is that broad outsourcing often destroys your ability to compete effectively. Outsourcing should generally be used to supplement, not to replace.

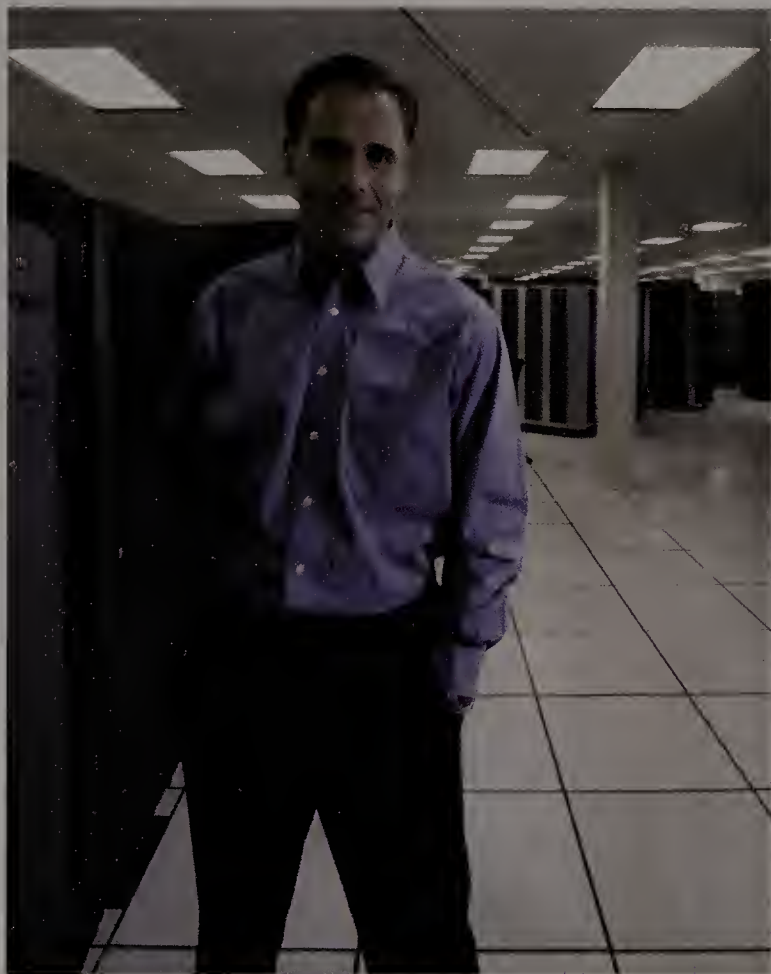
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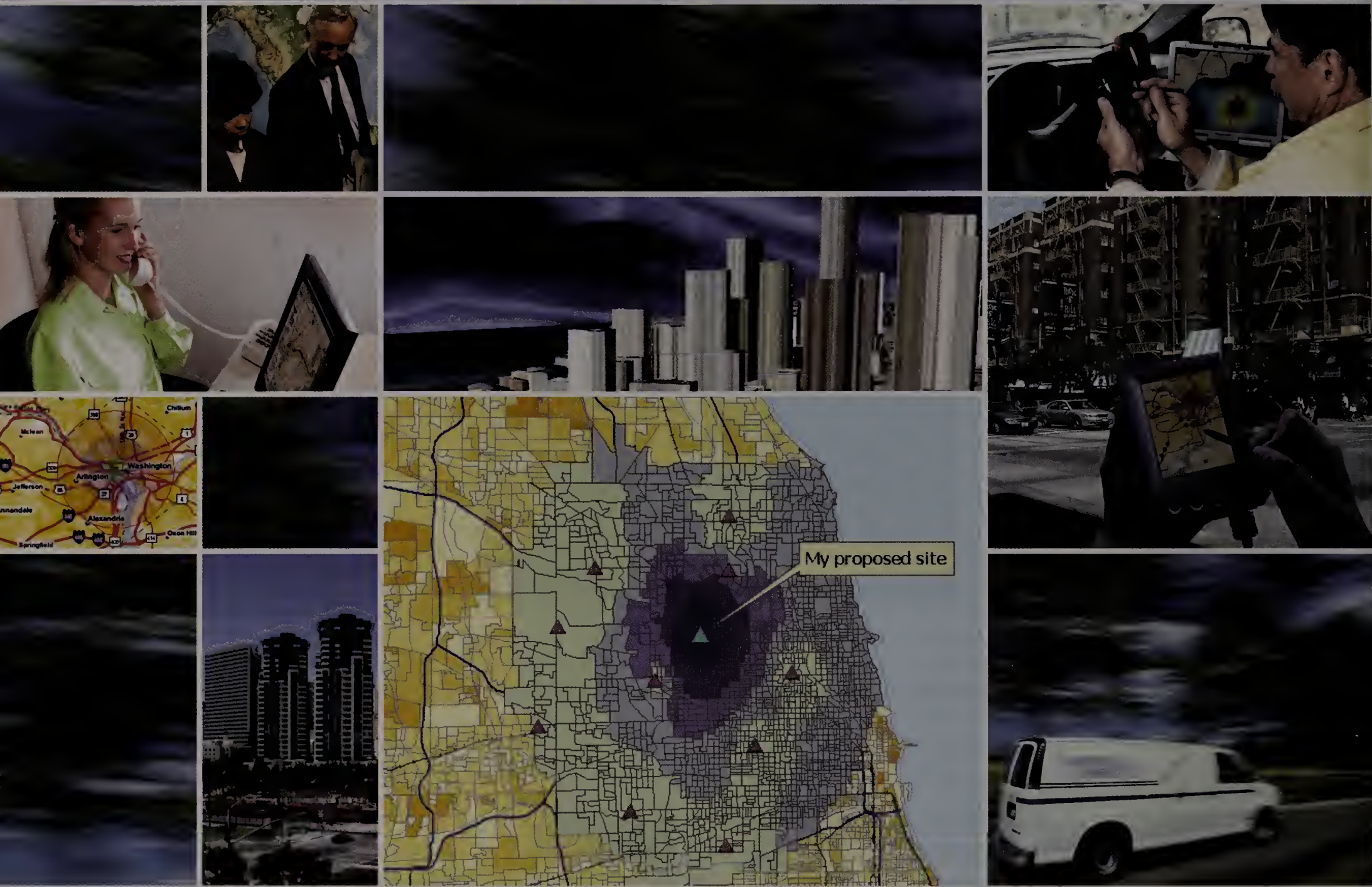
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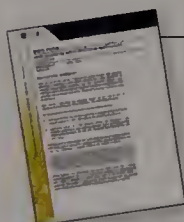


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trendlines

EDITED BY ELANA VARON

NEW * HOT * UNEXPECTED



World vs. U.S. for Web Control

INTERNET Debate during a United Nations conference this month will highlight a growing rift between the United States and the rest of the world over Internet governance that could result in changes to how the World Wide Web can be used.

The purpose of the World Summit on the Information Society, which opens in Tunis Nov. 16, is to generate ideas and strategies for extending the benefits of the Internet and other communications technology to the developing world. But these goals are being overshadowed by an effort among some of the world's most influential governments to transfer management of the Internet infrastructure to an international body. The United States

opposes the idea, and if no agreement can be reached there's a possibility that countries could end up creating their own versions of the Internet with their own rules for its use—a move that would disrupt international business.

Currently the Internet is coordinated by the Internet Corporation for Assigned Names and Numbers (ICANN), an independent organization that has international representation but is based in the United States and has close ties to the U.S. government. ICANN assigns domain names, manages the Internet's root servers and maps IP addresses to the domains.

A handful of countries, including Brazil, China and

Continued on Page 18

The Business of Better Software

VENDORS A group of leading software vendors has decided that part of the answer to the problem of buggy software is better quality control on its end.

Consequently, Adobe and IBM, among others, have formed the Software Economics Council (SECO) to improve their business processes and make their products easier to deploy and maintain.

One problem vendors see is too much lag time between gathering customer requirements and deploying the finished product. "We hope to bridge

the gap between those who create and build [software] and the users," says Donovan Neale-May, executive director of the Business Performance Management (BPM) Forum, a SECO founder.

SECO's first project concerns the mobile workforce. A BPM Forum survey conducted earlier this year found that at 26 percent of companies, more than half of employees work remotely. SECO wants to devise new processes for deploying mobile applications to make this task easier for customers.

—Margaret Locher

A Berry Good System



AGRICULTURE Cranberry growers harvested an estimated 649 million pounds of the traditional Thanksgiving fruit this year. But making a living from the berries isn't easy. Prices slumped earlier in the decade, and now energy costs are eating into profits. "Growers have been aggressive in looking for ways to save money," says Jeff LaFleur, executive director of the Cape Cod Cranberry Growers Association, and they're turning to IT for help.

One problem growers face is that cranberries are vulnerable to frost. Watering protects the berries, so on cold nights, growers can spend hours tending to pumps. To relieve this burden, a few Massachusetts growers have been experimenting with a system called Irrigation Automation, which uses wireless technology and the Internet to control irrigation.

Kevin Connolly, a Massachusetts GPS technology dealer, got the idea for the system during a sales call two years ago. The fleet manager for grower A.D. Makepeace told Connolly that he wished the company had a way to start its pumps remotely. The pumps are driven by automobile engines, so Connolly rigged the pumps with GPS devices that enabled the grower to operate them with a cell phone, similar to the way cars can now be started remotely.

The current version of the system is Web-based, allowing growers to program the pumps according to date, time and temperature recorded by remote sensors. Now Connolly is working on enhancements that will allow users to adjust watering schedules according to rainfall and wind conditions.

George Rogers, VP of A.D. Makepeace, says he expects the system will cut his irrigation-related labor by 80 percent. And by using water more effectively, Rogers says, growers may eventually be able to increase their crops. Recently, the U.S. Department of Agriculture gave LaFleur's group nearly \$187,000 to expand deployment.

—Elana Varon

No Bells or Whistles, Please

MOBILE TECHNOLOGY Looks like it's back to the basics for mobile device manufacturers. According to a survey by market research company TNS, what users want most isn't bigger displays, better graphics or even limitless coverage areas. They want better batteries.

Seventy-six percent of users in the United States responding to TNS's survey rated two

days of battery life during active use as the most important feature of the future converged device—a device that combines a mobile telephone and PDA with e-mail and other business applications. Next on the list is a high resolution camera and video camera, followed by full versions of Microsoft Office applications and 20GB of memory. Rounding out the top five: a global positioning system.

—Thomas Wailgum

What Mobile Users Want

Longer battery life	76%
High-resolution camera	50%
Microsoft Office	42%
More memory	41%

SOURCE: TNS

World vs. U.S.

Continued from Page 17

South Africa, have argued that de facto control of ICANN by the United States is incompatible with a global network. They maintain, for example, that the current governance structure does not accommodate domain names that use non-Western characters, making the Web less accessible to someone who doesn't know a Western language.

The internationalization proposal seemed to be headed nowhere until September, when the European Union changed its position and decided to support it. "We are looking for a new model which allows Internet governance on the basis of cooperation with all governments and stakeholders because the Internet is a global infrastructure," says Martin Selmayr, spokesman for EU Information Society and Media Commissioner Viviane Reding.

American and international business interests agree that it's important to extend the reach of the Internet, but that these needs don't warrant a new bureaucracy. "Bureaucracy would not be consistent with the dynamic nature of the Internet," says Ayesha Hassan, senior policy manager and executive in charge of information and communication technologies for the International Chamber of Commerce.

The United States would have to agree to any change in how the Internet is governed, and that seems unlikely. That leaves advocates of internationalization with little recourse but the threat to build new regional or national Internets that would be incompatible with the current one. If this were to occur, the Internet would no longer be an open global network.

Negotiators planned to meet once more immediately before the summit. But the two sides are so deeply entrenched in their positions that at press time an agreement seemed unlikely, according to Heather Shaw, director for e-commerce and telecommunications policy at the United States Council for International Business.

—Ben Worthen,

with additional reporting by John Blau

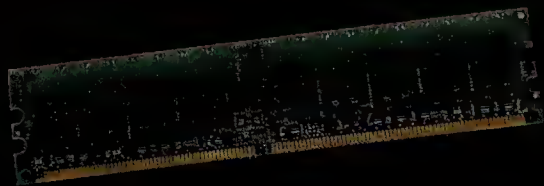
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MEDICAL RECORDS GONE WITH THE WIND

HEALTH CARE Many Hurricane Katrina evacuees lost their paper medical records in the storm. Consequently, they have no documentation of their medication histories and neither do their doctors and pharmacies. To help the hurricane's victims get appropriate medical treatment, the federal government, with help from other public and private groups, has established a website where health-care workers can retrieve prescription histories and related information on evacuees.

The site, www.katrinahealth.org, was assembled by networking existing databases from retail pharmacies and government health programs such as Medicaid. David Brailer, National Coordinator for Health Information Technology who is in charge of federal efforts to promote the adoption of electronic medical records systems, says the experience shows how quickly health-care information can be gathered electronically on a national level.

To protect patient privacy, the American Medical Association, the National Community Pharmacists Association and health-care IT company SureScripts first validates the identities of those trying to access the site. Caregivers can then log on to the site with a user name and password and enter a patient's name, date of birth, pre-Katrina address and gender to access his medication history.

Emily Stewart, health policy analyst for the Health Privacy Project, agrees that it's crucial to get evacuees the care they need. But she also thinks they should be allowed to opt out of the network if they want, and that the system should be dismantled once the need for it passes.

—Susannah Patton

washingtonwatch

EDITED BY ALLAN HOLMES

Help for Emergency Responders

Digital TV push would hasten better communications

Hurricane Katrina uncovered many shortcomings in the government's ability to react to a disaster, but one of the more serious deficiencies was the inability for emergency responders to communicate.



FCC Chairman **KEVIN MARTIN**

The hurricane knocked out more than 3 million customer telephone lines, 38 emergency call centers and about 1,600 wireless telephone transmission sites when it hit the Gulf Coast Aug. 29, making communication among emergency responders, as well as residents, impossible. Interactive radios could have solved the problem.

For years, emergency responders have argued the case for more radio spectrum so they don't have to rely on traditional means of communications. But Congress has yet to pass legislation to make room for them on the spectrum, which is already crowded by cell phones, broadcasters and the military. Now is the time to act, says Kevin Martin, chairman of the Fed-

eral Communications Commission.

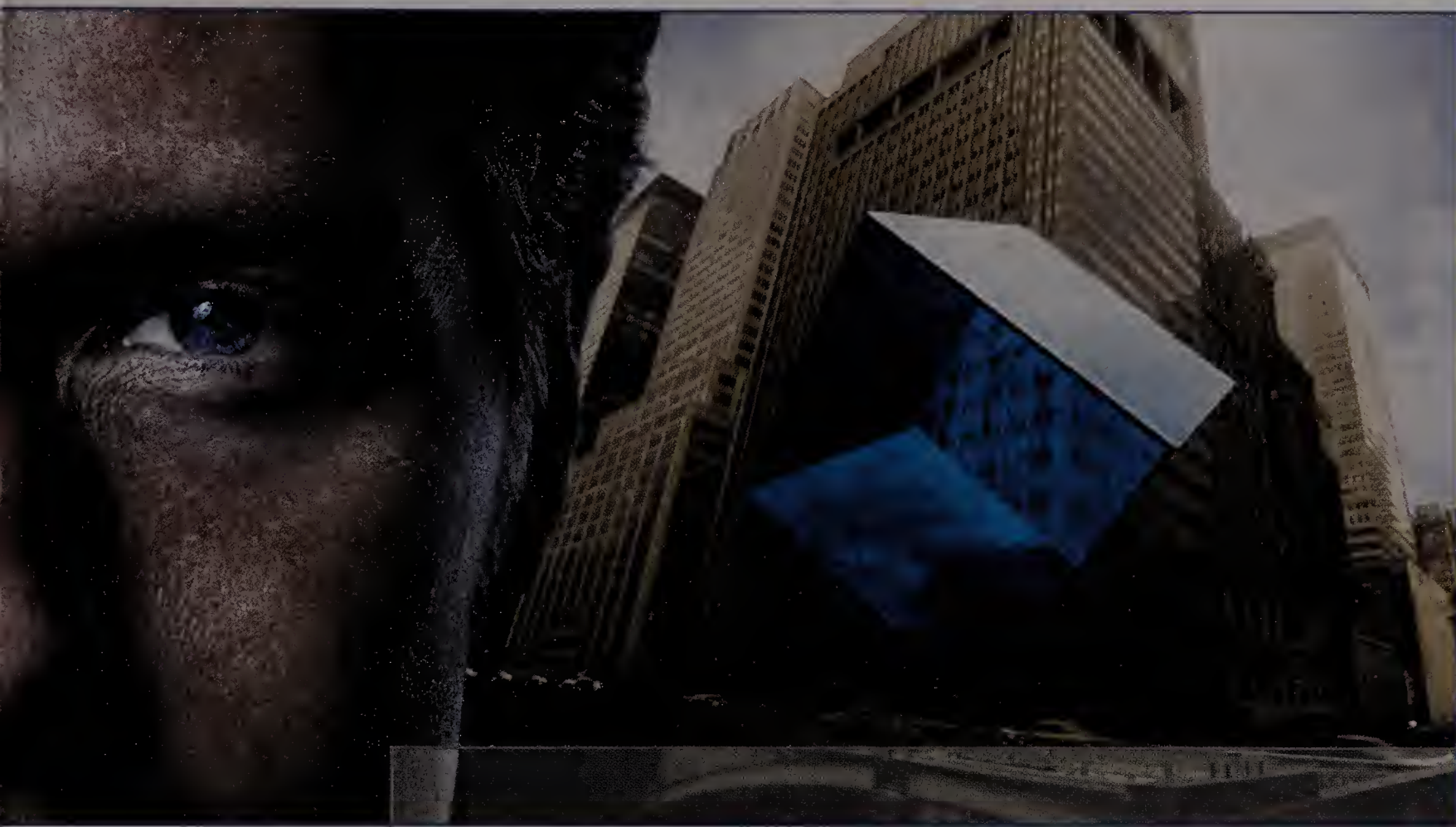
Katrina has boosted the prospects of proposed legislation that would free up some frequencies by giving television stations a hard deadline for transitioning from analog to digital broadcasts.

Currently, broadcasters are required to go digital only in those markets where 85 percent of homes can receive digital signals. With few, if any, markets meeting that threshold now, the transition could take years as consumers try to find the money to buy either digital TVs or converter boxes for their existing sets.

Then there is the opposition from the cable TV lobby. Although cable TV subscribers would not be affected by a digital transition—cable converts the digital signal for analog sets—cable operators are being asked by TV broadcasters to take on multiple digital channels. The cable operators argue they have limited capacity to carry the extra channels.

But the scenes of death and suffering in New Orleans may create enough political will to overcome inaction and opposition. It is almost a given now that legislation will be passed to force broadcasters to go fully digital. (Committees in the House and Senate were taking action on it at press time.) "The only thing left is for people to get out of the spectrum," says Mary Greczyn, spokeswoman for the High Tech DTV Coalition, a trade group representing companies such as IBM, Intel and Microsoft that favor faster migration to DTV.

—Grant Gross



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A Source for Sourcing

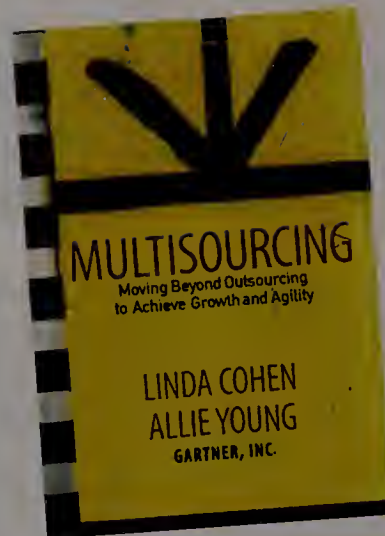
A guide to success, whether you outsource a little, a lot or not at all

BOOK REVIEW In one sense, write Linda Cohen and Allie Young of Gartner, IT outsourcing has been a rousing success. Economists argue that it's a major factor in corporate America's ability to remain profitable. Companies that announce outsourcing plans routinely see their share prices rise. CEOs of such companies get paid more.

And yet, half of all outsourcing contracts signed during the past three years will fail to meet expectations, say the authors in their book *Multisourcing*:

Moving Beyond Outsourcing to Achieve Growth and Agility.

Those failures can be traced to three problems: miscommunication, governance failure and poor coordination. The book provides a step-by-step process to prevent these problems, advice that includes creating a well-aligned sourcing strategy, evaluating and selecting service providers, and methods for long-term management and governance. Multisourcing here refers not to a specific sourcing model but to



Multisourcing: Moving Beyond Outsourcing to Achieve Growth and Agility

By Linda Cohen and Allie Young

Harvard Business School Press, 2005, \$35

a manner of setting up and managing the right sourcing

model for one's company.

Multisourcing is chock-full of helpful charts and lists, among them sample governance charts from DuPont and IndyMac Bancorp and a model outsourcing management dashboard. The "Eight Myths of Outsourcing," detailed in the first few pages, is a great weapon for any CIO being pressured into outsourcing; photocopy this page and keep it in your back pocket.

Cohen and Young overstate

the case when they conclude that multisourcing is a business revolution every bit as dramatic as the industrial revolution. And the book would benefit from a more in-depth look at some of the companies highlighted. Nonetheless, it's a practical guide to creating a foundation for sourcing success. And given the failure rates cited in this book, CIOs can use all the help they can get. (Read "Offshore Allies," Page 74, to learn how to succeed with one sourcing model, co-sourcing.)

—Stephanie Overby

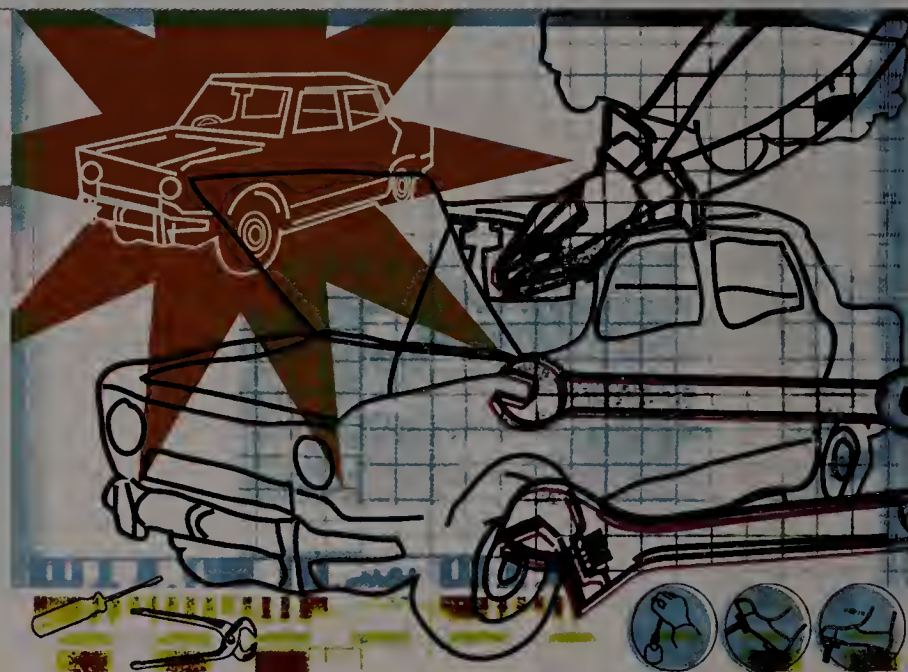
Virtual Mechanic

WIRELESS A new service from General Motors' OnStar subsidiary that performs remote diagnostics on vehicles and sends the owners reports once a month could eventually make it easier for car companies to use this data to prevent manufacturing defects.

The diagnostic tests are enabled through wireless communication with a car's computer system. When the car is in operation, data about the performance of the vehicle's critical parts and processes, including air bags, antilock brakes and the engine, is transmitted from the car's main bus to an onboard computer that sends the information to OnStar. OnStar then processes the information and sends an e-mail to the vehicle owner, who can use it to plan maintenance and repairs.

The service comes with an OnStar subscription and is available on most 2004 or newer GM cars. For model year 2006, more than 50 GM models will have OnStar as an option or as standard equipment.

Currently, the service is meant primarily to attract and retain OnStar customers, according to company executives. Down the road, auto industry analysts say, the technology could provide a new way for GM—and the auto industry generally—to gather data about how vehicles perform and build better cars. "Once we do get the data back in office, there is an opportunity for GM to understand what's going on in the field," says Steve Samolinski, OnStar's service line manager.

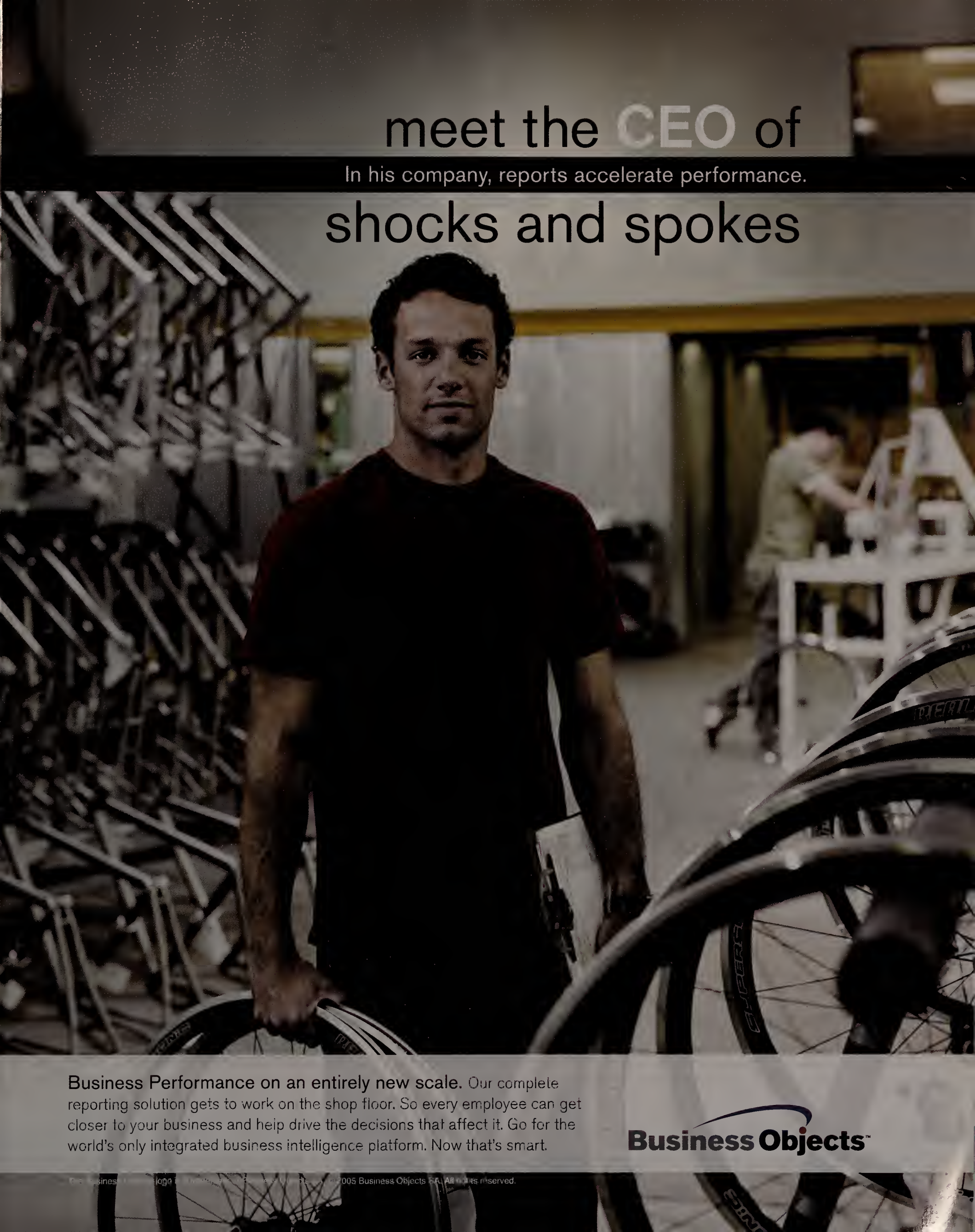


Until now, adoption of prognostics—the ability to identify impending system failures by analyzing vehicle data—has been slow, according to Joe Barkai, program director with Manufacturing Insights (owned by IDC, a sister company to CIO's publisher). Car companies have had to rely instead on dealers to pass on data they collect when they do repairs.

Although not very expensive to implement in comparison to OnStar, remote diagnostics was not a priority for auto manufacturers when the economy was poor, says Mark Büniger, an analyst at Forrester Research.

Now, that's changing.

—C.G. Lynch



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FROM INCEPTION TO IMPLEMENTATION—I.T. THAT MATTERS

Edited by Christopher Lindquist
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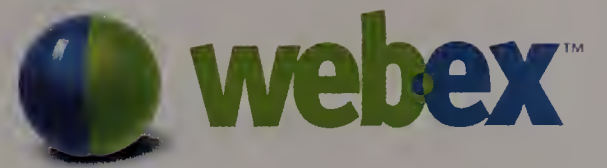
Open Source Lights Up

BY GALEN GRUMAN

OPEN SOURCE | The odds are good that the LAMP stack is running somewhere inside your company. The acronym refers to the foundational foursome of the open-source movement: the Linux operating system, Apache Web server, MySQL database and, collectively, the Perl, PHP and Python programming languages. Development tools such as Eclipse and application servers such as JBoss have also gained popularity—and trust—especially now that major vendors such as IBM, BEA Systems and Borland have adopted or supported them commercially. But what about the next step up the software ladder? Is open source ready for ERP, business intelligence or CRM?

Ready or not, it's happening; the first industrial-grade applications in these areas are now emerging. And CIOs will soon need to decide how to approach these fresh options in their enterprise software catalog. As with the adoption of the LAMP players, these new open-source enterprise applications likely will find their way into the enterprise at a departmental or small-project level. As a result, "we don't see [these applications] on CIOs' agenda at all," notes Michael Goulde, an open-source senior analyst with Forrester Research. But, he warns, "CIOs should sync up with their development teams to see [where such applications] might have payback to the organization."

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However, CIOs should tread carefully on such open-source applications, advises Mark Lobel, a partner at PricewaterhouseCoopers who focuses on information security, including security for financial applications. One key concern is that applications tend to reflect and embed business processes and logic, which often are key strategic assets you don't want to share with others—and open-source licenses can require such sharing if companies aren't

Open source depends upon volunteer developers for success, but the more niche a product, the smaller the potential pool of interested contributors.

careful. Another issue is the long-term viability of open-source applications for specific functions. Open source depends upon volunteer developers for success, but the more niche a product, the smaller the potential pool of interested contributors. As such, grassroots support for specific apps such as ERP or CRM tools may look more like brigades than the armies now supporting broad open-source infrastructure such as Linux, Apache and MySQL.

Still, properly managed open-source applications can save enterprises money and time—as well as reduce dependency on specific vendors.

Finding a Fit

Financial-services giant Fidelity Investments has used open-source technology for

But Is It Really Free?

It pays to read the fine print on open-source licenses

Open-source applications typically provide free use of the software and access to its source code. But if you plan to distribute the modified application outside your company, open-source licenses usually require you to return any enhancements to the user community, says Michael Goulde, a senior analyst at Forrester Research. But as the open-source model moves up the stack to applications, the term *open source* is morphing to accommodate corporate needs.

More restrictive licenses are emerging with the new class of open-source CRM applications. For example, a version of SugarCRM is available under a variation on the standard General Public License (GPL). But users of SugarCRM Pro, available under a separate license from SugarCRM, get a different deal. The SugarCRM license works much like a proprietary software vendor's license, with the exception that Sugar provides the source code and lets companies modify it for internal use only. And that modified code belongs to the user company, not to SugarCRM.

This model is becoming common as more companies build businesses around open-source software for which they offer both a "pro" version and for-pay support services, says Goulde.

"Their free version is really a marketing tool," says Bob Gatewood, CTO of Athenahealth, a service provider to doctors and a SugarCRM Pro customer. That suits Gatewood just fine, since the SugarCRM license still lets Athenahealth customize its CRM code easily, without requiring expensive pro-

fessional services that, for example, a Siebel CRM deployment might require.

Another example is the Veteran Administration's Vista electronic records software, which is available free as public-domain software. Although the VA has integrated enhancements made by some users in later releases, it still manages the core code development. Private companies have created proprietary extensions and add-ons that they sell to Vista users. They've also customized the Vista code for their clients, but none of these efforts belong to the VA or the Vista community as they would in traditional open-source efforts such as Linux, Apache or BSD Unix.

The Avalanche Corporate Technology Cooperative is taking a private open-source approach: Enterprises and consultants can join, which provides them access to software developed by the Avalanche members. (The cooperative is just starting its first efforts, including a Sarbanes-Oxley compliance project.) As with open source, the members all contribute technology to various Avalanche efforts, and Avalanche members provide mutual support. Unlike open source, however, only Avalanche members have access to this technology, which its founders believe will ensure development efforts stay focused on members' business priorities.

For CIOs, this means that some open-source tools might in fact be just partially open source, requiring a careful understanding of the license and the program's contents. "You really need to read the license," advises Athenahealth's Gatewood. —G.G.

about four years to reduce costs and dependence on vendors. "We started with Linux like everyone else did, but our intent all along was to see how far up the stack we could go," says Charlie Brenner, senior vice president of the Fidelity Center for Applied Technology, Fidelity's technology incubation group.

After Linux, Fidelity adopted Apache and Perl, and then the Struts Web application framework and the Eclipse Foundation's development environment. Fidelity is now looking at open-source database management systems and assessing what applications might make sense. The advantages of

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open source include widespread component reuse, better access to underlying code to customize interfaces across applications, and less complex systems to manage. "We're heavy users of proprietary [software], and that won't change, but there are times you need a motor scooter, not a truck," Brenner says.

Others are less interested in picking the proper vehicle than they are in creating a uniform, inexpensive core on which to hang their IT business. At Midland Memorial Hospital in Texas, "we're trying to get a complete open-source or public-domain stack rather than be proprietary," says IS Director David Whiles. His organization already uses the LAMP stack and is now deploying a public-domain electronic records system, the Veteran Administration's Vista, for less than half of what a proprietary system would cost (even with the cost of hiring a consultancy to add features such as billing). Medical industry service provider Athenahealth, meanwhile, is using SugarCRM—an open-source CRM package. CTO Bob Gatewood says he had several reasons to switch from his current CRM provider, Salesforce.com. But he notes that making the change will save about \$1 million over three years in per-user licensing fees, even after the cost of development and integration is subtracted. He expects to complete the migration in early 2006.

Open source makes good sense for nonstrategic, fairly generic applications like reporting or sales-force automation.

Easy Mixing

Beyond spending less, Gatewood plans to more closely integrate the SugarCRM code—which he can access directly—into his call-center and other support applications, something not possible with proprietary software where code is tightly held by the vendors. Other IT execs seek the same benefit. "We can take the pieces we

need [with open source]," says Bob Hecht, vice president of content strategy at specialized data provider Informa, which is investigating the Alfresco open-source knowledge-management application as an alternative to commercial enterprise content-management tools.

Informa is exploring Alfresco because a license for a commercial enterprise content management application for a company of its size would cost millions of dollars and would impose a single content-management model on the company's array of publishing, training and events businesses. "We just won't do that," Hecht says. (It also helps that Alfresco was developed in part by former Documentum technologists, giving Hecht more confidence that the application will be enterprise-class.)

Starting Small

Open-source applications can make especially good sense for nonstrategic, fairly generic applications like reporting or sales-force automation. Departments that have unique technology needs and smaller companies with limited budgets are also more likely to consider open-source applications, says Forrester's Goulde. "Larger companies are not about to rip out SAP. Plus the functionality and the integration are both more complex" for a large company than open-source apps currently can handle, he adds.

For example, open-source tools "are not going to take the business-intelligence market because they are not yet competitive with commercial software," says Eric Rogge, research director for BI and performance management at Ventana. For example, open-source BI applications don't yet offer a comprehensive platform with reporting, ad-hoc analysis, online analyti-

61%

of developers in Europe, the Middle East and Africa have used open-source software for development, but only a third have contributed to the open-source community.

SOURCE: Evans Data, 2005

cal processing (OLAP) connectivity, alerting, dashboards and workflow. Nor do they offer aids for developing user-interface controls, ad-hoc analysis against relational data sources or scorecard functionality with strategy maps, metrics management and collaboration features, he says. But Rogge does expect open-source applications to eventually make inroads in the BI reporting tool segment, since there are a variety of uses for basic reporting tools in an organization where a costly, complex BI tool isn't needed.

Furthermore, increased adoption of open-source databases should encourage the development of open-source reporting tools that take advantage of them, says Don DePalma, an analyst at the consultancy Common Sense Advisory. "Most database activity is about reporting, analyzing and crunching the data, so [open-source reporting tools] would seem a natural development. Companies, universities or

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governments using open-source operating systems and databases would be a great audience for such software," he says. DePalma doesn't expect a popular reporting tool like BusinessObjects' Crystal Reports, for example, to support open-source databases because of the vendor's relationships with proprietary database developers such as IBM, Microsoft and Oracle. That provides an opportunity for the open-source community to create a Crystal Reports-like reporting tool, he says.

Open-source applications also make sense when there are regulations or other requirements common to an industry, where having a mutually supported tool would benefit everyone and not put anyone in the position of losing a competitive advantage, Goulde says. Analysts most often cite the health-care and financial-services industries as candidates for these

unfamiliar with the competitive value of various components might accidentally embed strategic business logic or processes into code that is then provided back to the open-source community, neutralizing a competitive advantage.

But CIOs should be able to manage their strategic assets while still choosing open-source applications, says Eric Link, Diabetech's CTO. Business logic, for example, should not reside in modified open-source code but in your internal rules base or in-house applications that call the open-source tools, as is common in commercial ERP systems, he says. "It does require careful thought to know what is strategic," but any IT development effort should make such an assessment, whether it involves commercial, homegrown or open-source code, Link says.

CIOs should also be able to distinguish

company's data, but it would never incorporate that data into its own code—and thus a company would never be required by the license to release the data as open source. (Another alternative is to go pseudo open source as in the Avalanche Corporate Technology Cooperative, which openly shares code on a variety of projects, but only among subscribed members. (See "But Is It Really Free?" Page 26.)

Beyond intellectual property concerns, another significant risk is an application's long-term viability. Open source has worked well for widely distributed tools such as those in the LAMP stack that are typically run as-is and don't need to be customized at each location. But for niche applications, the community of developers is necessarily smaller than for a piece of infrastructure, reducing the resources that contribute to the application's development, maintenance and support. This could make it difficult for many projects to muster sufficient developer support to stay viable. The diversity of applications will be a difficult issue for the open-source community, says PricewaterhouseCoopers' Lobel.

This limitation is exacerbated if companies don't share their developments with the community for fear of releasing competitive business logic. "I can't see it going very long if companies aren't contributing back. An open system works only when it's open," Lobel says. Diabetech's Link, however, believes that argument is overstated, since companies are typically happy to share infrastructure code with others, thus moving the application forward even while keeping their business-specific code to themselves.

Despite these issues, even cautious observers concede that open-source applications can make sense beyond the LAMP stack: And sensible CIOs should start paying attention. **CIO**

Galen Gruman (ggruman@zangogroup.com) is a freelance writer based in San Francisco. Send feedback to Christopher Lindquist at clindquist@cio.com. For a list of open-source development projects, visit www.cio.com/111505.

Staff developers unfamiliar with the competitive value of various components might accidentally embed strategic business logic or processes into code that is then provided back to the open-source community.

kinds of tools, though liability concerns surrounding legal requirements make it critical that potential users understand the possible risks, notes Fidelity's Brenner. It is also possible to imagine a large player in a specific industry making an open-source application viable, perhaps for some supply-chain management functions, much as Wal-Mart has done for RFID, notes Forrester Research ERP Analyst Ray Wang.

Gauging Open Source's Risks

But using open-source applications does carry risks. One is that staff developers

between applications and platforms and the issues that surround each, Brenner adds. Reporting tools and CRM are two examples of platforms that are often marketed as applications, he notes. The difference is that platforms typically don't encapsulate specific business processes or logic, making them well-suited for open-source efforts—and less risky for the companies that use them, as companies using such tools will be less tempted to insert their own business logic into the products and unwittingly release it to the world. A reporting tool, for instance, might act on a

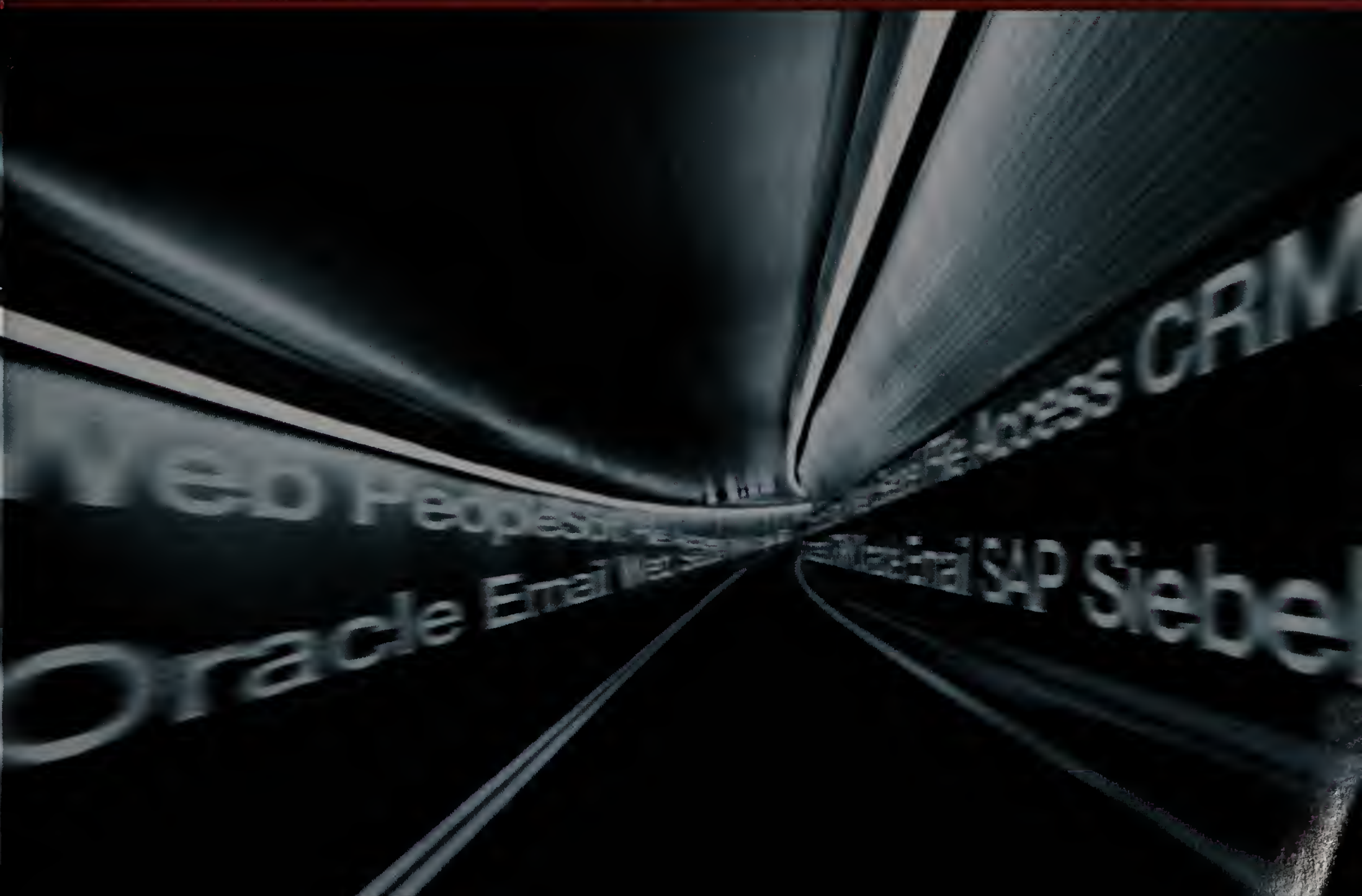
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Innovation Alchemy

One of the most important things CIOs can create is the right mix of healthy environment and reliable process in order to foster innovation



At the CIO 100 Conference in August, a panel on innovation produced some provocative glimpses into how a few of the nation's most IT-intensive enterprises—including Capital One, Circuit City and 1-800-Flowers—actually (re)organized themselves to create new value.

The panelists—all top-notch CIOs—were remarkably candid about the challenges they are facing as they push their companies to convert technical capacity into business capability. Circuit City, for example, set up select teams of innovation champions from operations but discovered that its people struggled to balance their everyday responsibilities with their new innovation missions. 1-800-Flowers found that small, quick and dirty rapid-prototyping teams could open up vast new market opportunities faster, better and far cheaper than expected. Capital One achieved some good results by rotating high-potential managers from business units into IT leadership positions.

Each CIO acknowledged that traditional notions of accountability required tweaks when enterprises genuinely commit themselves to innovation—not just operational excellence—as a medium for growth. These CIOs, for instance, talked about how they installed new reward incentives and had to be more creative about managing the risk associated with trying something new. They had to make special dispensations for failed experiments.

When the time came for questions from the floor, I couldn't resist the urge to focus the wide-ranging conversation on some fundamental principles. So I asked: Where do you think you get the best return from your innovation investments? From the people you hire? From the innovation processes you put in place? Or from the innovation environment you seek to create?

ILLUSTRATION BY BLAIR KELLY

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Think these CIOs gave the oh-so-politically correct answer of “people”? Sorry; not a one. The split winners were process and environment. Why? Because as one of the panelists put it, “Even if you hire the right people—and we think we do—they need to be in an environment that encourages them to be innovative in ways we can use.”

The CIO who championed process put it another way: “We like the consistency and discipline that good process provides. Innovation should be a business process.”

Environment vs. Process; Take Your Pick

These are distinctions with a difference. Environments are not unlike the weather; they create climates where informal collaboration and spontaneous interactions are warm and encouraging or chilly to the point of being frigid. Environments stress recognition-and-reward systems where leadership by example is the norm and the organization provides resources that ostensibly reinforce the values it claims to aspire to. For example, organizations that celebrate teamwork and collaboration have open office plans with open and inviting meeting rooms along with water coolers and coffee carts that have nearby lounge chairs and whiteboards. Healthy innovation environments might feature “show and tell” brown bag lunches where project team leaders present early-stage prototypes to interested people from around the organization in search of constructive feedback and useful criticism. Oh, yes: The Boss—the CIO, CMO, CFO or even the CEO—occasionally stops by to see what’s going on and communicate support.

By contrast, process is about consistent and rigorous methodologies that reliably turn selected inputs into desired, measurable and measured deliverables that the organization genuinely

values. Process is about continually looking for ways to subtract wasteful time, energy and investment while adding new value. Process stresses recognition-and-reward systems where leadership is measured by the ability to make that process more reliable, agile,

robust and cost-effective. Healthy innovation processes invite aspiring innovators to attach some discipline and rigor to their wilder ideas. Think GE’s Six Sigma initiatives—sure, there were teething pains in the beginning but the new metrics and mindsets it fostered yielded enormously productive changes. The (relative) lack of arbitrariness and politics in a healthy innovation process make it something that invites participation and contribution. Not surprisingly, good innovation processes enable good innovation environments.

Whether you agree or disagree with these distinctions, the clear consensus from the panel was that one of the most important strategic allocations CIOs can make is defining what peo-

Your innovation approach must dovetail with the way other departments handle it.

ple, process and environmental investments they’ll need for innovation. Yes, balance is nice. But a well-designed innovation process attracts and inspires people as surely as does an open and challenging innovation environment.

While people remain the vital ingredient, the fact remains that CIOs do have serious choices to make about whether they’ll get a better return on their innovation investments from creating better environments or better processes. While this isn’t an either/or proposition, CIOs need to ask themselves whether they prefer to be “branded” by their colleagues and employees—not to mention their CEOs—as successful creators of innovation environments or as reliable leaders of innovation processes.

Why is this so important? Because CIOs, whether they like it or not, have to recognize that their innovation processes and their innovation environments need to dovetail with innovation environments and processes throughout other parts of their organizations. If you’re an innovation process CIO and your CMO is a brand-driven, innovation environments kind of leader, you’ve got a compatibility problem. Similarly, if you’re running an innovation environment shop where everybody’s an innovator and your VP of sales is Ms. Sales Force Process Excellence, good luck on implementing that channel management rollout.

While it’s true that virtually all organizations of size have their own little innovation process pockets and microclimates, the truth is that CIOs have a special responsibility to strategically rethink how best to blend process-defined and environment-shaped innovation enterprisewide. Precisely because IT organizations enable innovation throughout the enterprise, the supply chain and the customer, CIOs have to devote special care in determining whether process or environment offers the better organizing principle for innovation initiatives.

Listening to the CIO 100 panel, it was absolutely clear to me that these are precisely the questions these leaders are wrestling with. They know they need to be more innovative; they know their IT shops need to be more innovative; and they know their companies need to be more innovative. Indeed, they’re looking for innovative people to hire and train. But there’s no doubt that they’re paying extra special attention to whether it’s better environments or better processes that will tap the innovative best in their own people—and in people enterprisewide. Innovatively balancing process and environment for cost-effective innovation is at the core of real CIO leadership. **CIO**

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PHOTO BY JOHN SOARES

Add a Comment

Is an attitude of complacency freakin’ obvious in your company? And if so, what are you doing about it? Share your hard-earned wisdom with Michael Schrage. Find the comments box on the online version of this article. Go to www.cio.com/111505.

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CASE STUDY



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—Scott Ohman, Manager E-Business Commercial,
Cathay Pacific Airways, Ltd.

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A Comprehensive Approach to Dynamic Application Delivery

Inside the Software Testing Quagmire

Software testing reveals the human failings behind the code. That's why it can become a never-ending exercise in denial. Here are five questions that you can ask to help you cut through to testing's root problems.



There are few things worse than being responsible for a software project mired in testing. To those waiting to use the software, the project seems done. But it isn't. The software needs to be tested to ensure it functions properly and is stable and reliable. And the project manager's frustration mounts as days turn into weeks, weeks turn into months, and—heaven forbid—months turn into years. (For best practices for running your testing organization, see "Testing, 1, 2, 3...11," Page 63.)

This process is doubly frustrating for CIOs removed from the action. Testing managers—who may not be skilled at communicating with CIOs—can distract attention from the real problems by being overly detailed or focusing on irrelevancies.

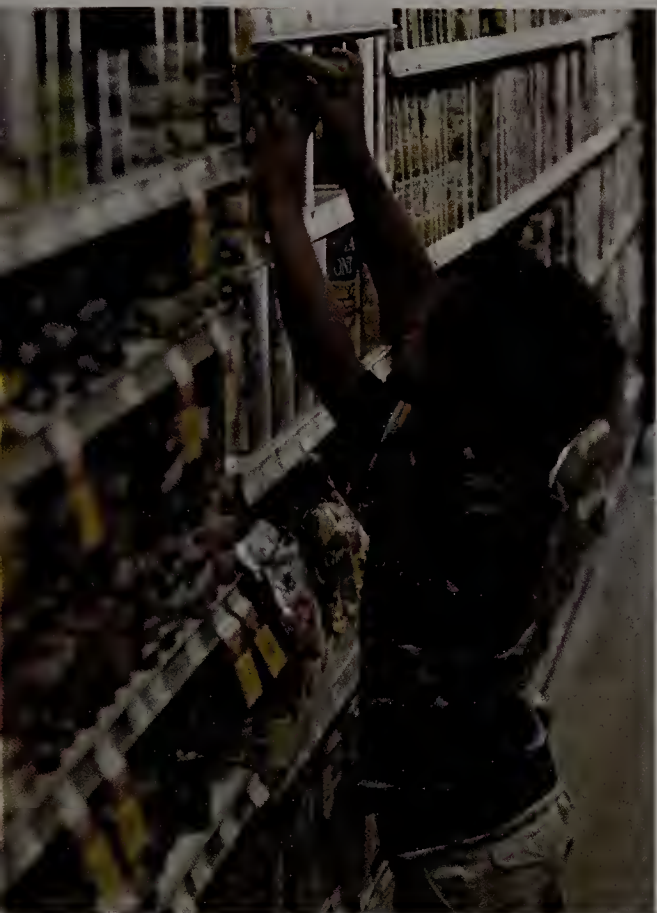
CIOs must assess the situation for themselves, asking the testing manager the following five questions face-to-face and observing how wide his pupils dilate.

Question #1: Is the software's functionality clear, complete, documented and subject to a formal change process?

You're really asking: Are we trying to hit a moving target?

You're trying to determine: If the problem is that the software is poorly defined or that the project's scope has changed.

Interpreting the response: If the software's functionality is not fully documented or is not clear, testers will have difficulty determining whether it meets the project's goals. When functionality is subject to interpretation, test cases might not reflect what was originally intended. If functionality changes because the organization continually adds, modifies or deletes functions, testers will have difficulty keeping up. Only changes critical to the integrity of the software should be allowed.



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A related symptom to check: Intense debate about requirements and test results.

Question #2: Is development complete?

You're really asking: Are the testers essentially starting over with each new release because there are so many changes?

You're trying to determine: If the software has been released for testing prematurely, or if changes are uncontrolled.

Interpreting the response: Software released prematurely will differ markedly from the previous release. With all the changes, testing performed on a previous release might no longer be relevant to the new one. If testing of one release is not completed before the next one arrives, there will be no comprehensive understanding of release defects.

After each release, the software will change due to user feedback. But problems will occur if developers and testers do not agree about which changes will be made. If developers decide to implement sweeping design changes or to improve software already functioning correctly, the testers will be the dubious beneficiaries of releases that behave very differently from previous ones. Again, testing efficiency will be very low.

A related symptom to check: Complaints about the frequency of releases, about releases being delivered without notice or about significant changes in a release.

CIOs must assess the testing situation for themselves, asking the testing manager questions face-to-face and observing how wide his pupils dilate.

Question #3: Are test cases comprehensive and repeatable; are they executed in a controlled environment?

You're really asking: Is testing ad hoc or disciplined?

You're trying to determine: If testing is effective.

Interpreting the response: There should be a set of repeatable test cases and a controlled test environment where the state of the software being tested and the test data are always known. Absent these, it will be difficult to discern true software defects from false alarms caused by flawed test practices.

A related symptom to check: If temporary testers are conscripted from other parts of the organization to "hammer" the software without using formal test cases, it means the organization is reacting to poor testing by adding resources to collapse the test time, rather than addressing the problem's root causes.

Question #4: Is there a process being followed to evaluate each defect and prioritize its resolution?

You're really asking: Is the organization tackling the most severe problems first and agreeing on the contents and timing of the next release?

You're trying to determine: If the organization is making good decisions about where to apply its assets.

Interpreting the response: Defects vary in severity. For example, a defect in the cosmetics of a screen form is less severe than a defect that stops the software cold. A defect that impacts many users is more severe than one that impacts few users. The order in which the development team resolves defects should be in line with their severity.

Trouble occurs when the development and test teams do not communicate about which defects to remedy and in which order. To ensure improvement of the software and for the test phase to move toward completion, the development and test teams must collaborate.

A related symptom to check: The number of highest-severity defects does not diminish over time; friction exists between development and test organizations.

Question #5: Does the organization collect testing metrics at regular intervals? The total number of test cases? The number that passed and failed? The number of defects—by degree of severity—in the process of being fixed?

You're really asking: Can the organization quantify the state of testing?

You're trying to determine: Can the organization measure progress?

Interpreting the response: Metrics enable informed testing decisions. If metrics are not recorded and published on a regular basis, progress will remain uncertain.

Metrics relating to test cases and defects must be captured, published and tracked. With these metrics you can determine whether defects are climbing, cresting or diminishing, and whether the most severe defects are being attacked first. You will see trends and be able to make corrections.

A related symptom to check: There are differing opinions about the state of testing, open defects and trends.

Because software testing ultimately exposes human failure, it's difficult to know whether the process is achieving its goal of creating the best software. People don't like to admit mistakes. They can go to extraordinary lengths to hide mistakes or take unilateral steps to try to remedy problems before others can discover them. "Busy-ness" is no guarantee of progress—indeed, it may indicate the worst kind of testing failure. CIOs can provide a critically important perspective on the process to get testing back on track and keep it there. **CIO**

Paul Garbaczski has held a variety of systems development, management and business positions at major enterprises over the past 30 years. Please send your comments to Executive Editor Christopher Koch at ckoch@cio.com.





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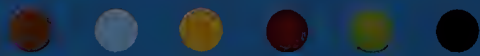
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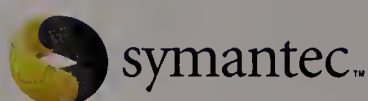
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Policy Must Fit the Culture

Corporate security isn't something that kicks in when things go awry.

It's a way of life; a culture that reflects the very health, vitality and integrity of a business. Of course, corporate security is the inalienable responsibility of every corporate citizen. But it is most certainly energized from the top down.

Security does — or should — garner fierce attention at the board level for good reason.

Just consider what's at stake: the brand, shareholders, customers and employees. Security literally impacts every aspect of the business and indeed contributes to business continuity and the overall financial well-being of the business.

That's why senior leadership must close the gap between business management and security operations, says Ed Casey, director of corporate security at Cincinnati-based Procter & Gamble Company. CSOs need to understand the business to protect it effectively, and business managers need to appreciate how security can positively impact the bottom line.

But a security-conscious workplace doesn't just materialize on its own. Executive management needs to initiate the culture with a simple, yet comprehensive, security program. "Measurably effective logical security cannot exist without effective physical security or a corporate culture that is intolerant of misconduct," explains George Campbell, former CSO of Fidelity Investments, security consultant and member emeritus of the CSO Executive Council.

Francis D'Addario, vice president of partner and asset protection for Starbucks Coffee Company of Seattle, Wash., offers some guiding principles for formulating a top-notch security culture:

- Require the protection of people first.
- Underscore the values of corporate culture to safeguard brand equity.
- Support the company's mission with

service-level expectations.

- Require interweaving security and safety as an enabler for every business opportunity.
- Insist on world-class processes for security incident awareness, prevention, detection and mitigation.

Don't be lulled into thinking of security in terms of things. "Computer viruses or natural disasters won't be the undoing of a business," Campbell warns. "Corporate meltdowns are caused by bad ethics, ineffective controls and other human behavior."

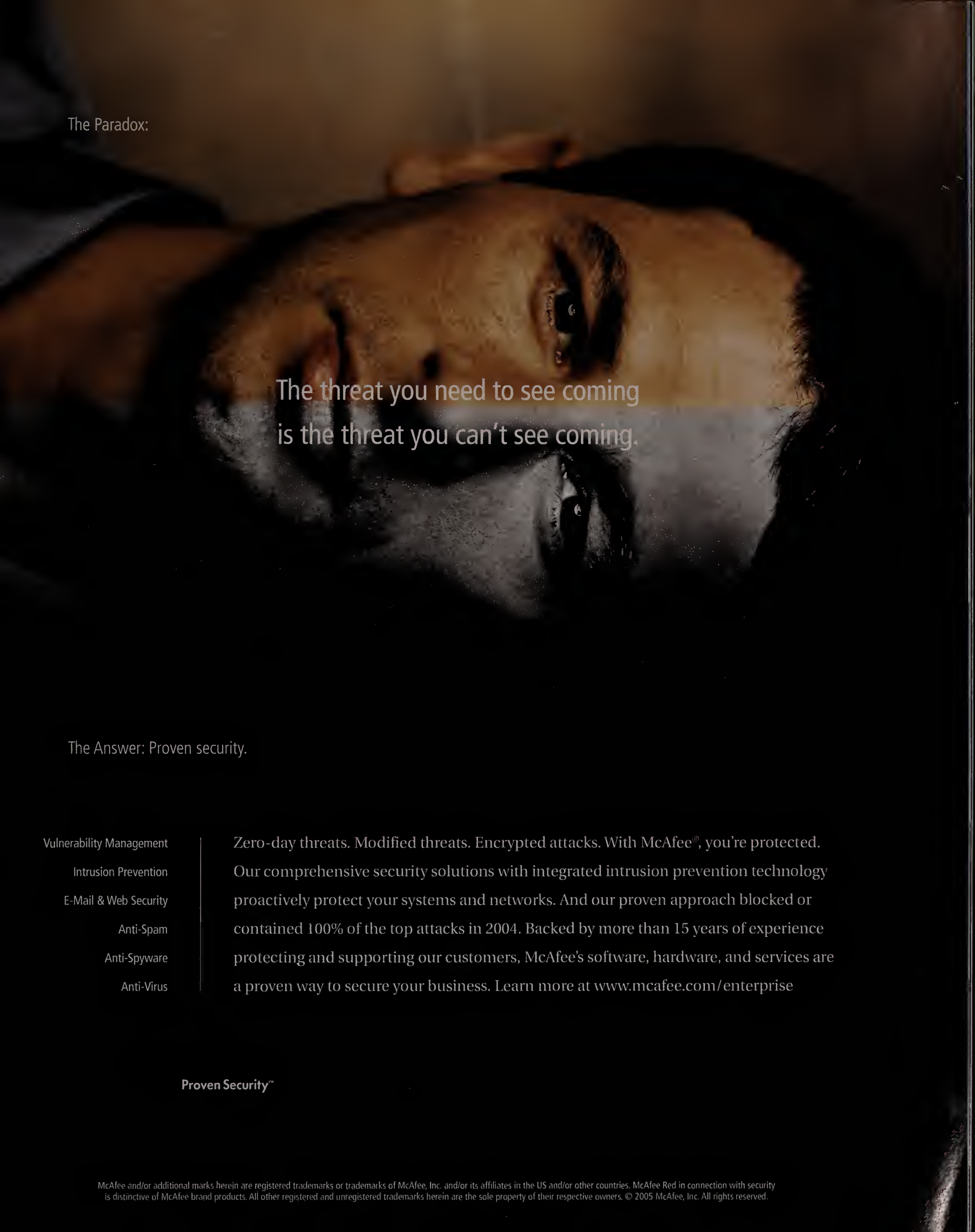


Are You Ready? How to Handle Today's Corporate Security Threats

Today's top threats? Business interruption due to workplace violence, cyber crimes, natural disasters or terrorism; damage to the corporate image due to loss of critical business information or noncompliance with security regulations; product or supply chain disruption because of inappropriate preparation for emergencies. The list goes on and it changes daily.

It's no wonder that the issues keeping CSOs awake have or should have made it to the boardroom table. Equally as important are the board's concerns, which had better be on the security group's radar screen.

For example, Michael Frankovich, director of corporate security at Duke Energy in Charlotte, N.C., says workplace violence is what plagues his slumber because the stakes are so high. He notes that the most egregious incidents aren't frequent, and executives tend to assume that employees are safe in their own



The Paradox:

The threat you need to see coming
is the threat you can't see coming.

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building. A comprehensive and effective security program will let executive management sleep soundly in that regard.

Richard Lefler, former CSO of American Express and a Scottsdale, Ariz.-based consultant specializing in strategic security planning, says the greatest emerging threat is the risk of global flu pandemic like Avian Influenza (H5N1). It's projected to hit in the next two to three years and is already being monitored at the executive level. Keeping employees safe is paramount, but this form of security planning significantly varies from the norm. That could explain why this type of threat and prepared response is often overlooked until the crisis is imminent.

Lefler says executives can better manage any security threat through situational readiness: "Executive management needs a framework that

the process. For instance, geographic relevancy might dictate prioritization of events within five miles of a plant versus 500 miles.

James Ashby, director of corporate security and loss prevention at Boise Cascade, puts it succinctly: "The greatest threat is not the threat itself, but rather the perceptions and expectations surrounding the threat."

Sing-Sing or Fort Knox? Security Beyond the Perimeter

Maintain a rock-solid perimeter and all is right with the world. Right?

Wrong. Sing-Sing and Camp Cupcake can be locked down as tight as Fort Knox, but that doesn't make either a safe place.

It's the integrity of the individuals within the perimeter that makes for a secure environment.

According to a *CIO Magazine* and PricewaterhouseCoopers survey ("The Global State of Information Security 2005"), the problem is that roughly 33% of information security (IS) attacks originate from employees, with another 28% coming from ex-employees and partners.

The best way to avoid this threat is thorough background checks during the hiring or contracting process. Contractors, supply chain partners and outsourcing vendors

turnstiles, and a glass door certainly can't stop vehicle-borne weapons." What's worse, thousands of "outsiders" are invited into the inner sanctum every day. "Once these folks are inside the building, you must rely on different forms of monitoring and a security-conscious culture to protect the business," adds Frankovich.

From the IT perspective, the CIO survey suggests that IS organizations increasingly monitor employees to "rein in instant messaging and other applications, put down rampant spam and malware, shield the company from liability when employees use peer-to-peer networks to download copyrighted material and monitor for evergreen insider threats." A whopping 88% of respondents say they have IT monitoring in place, or plan to by year's end.

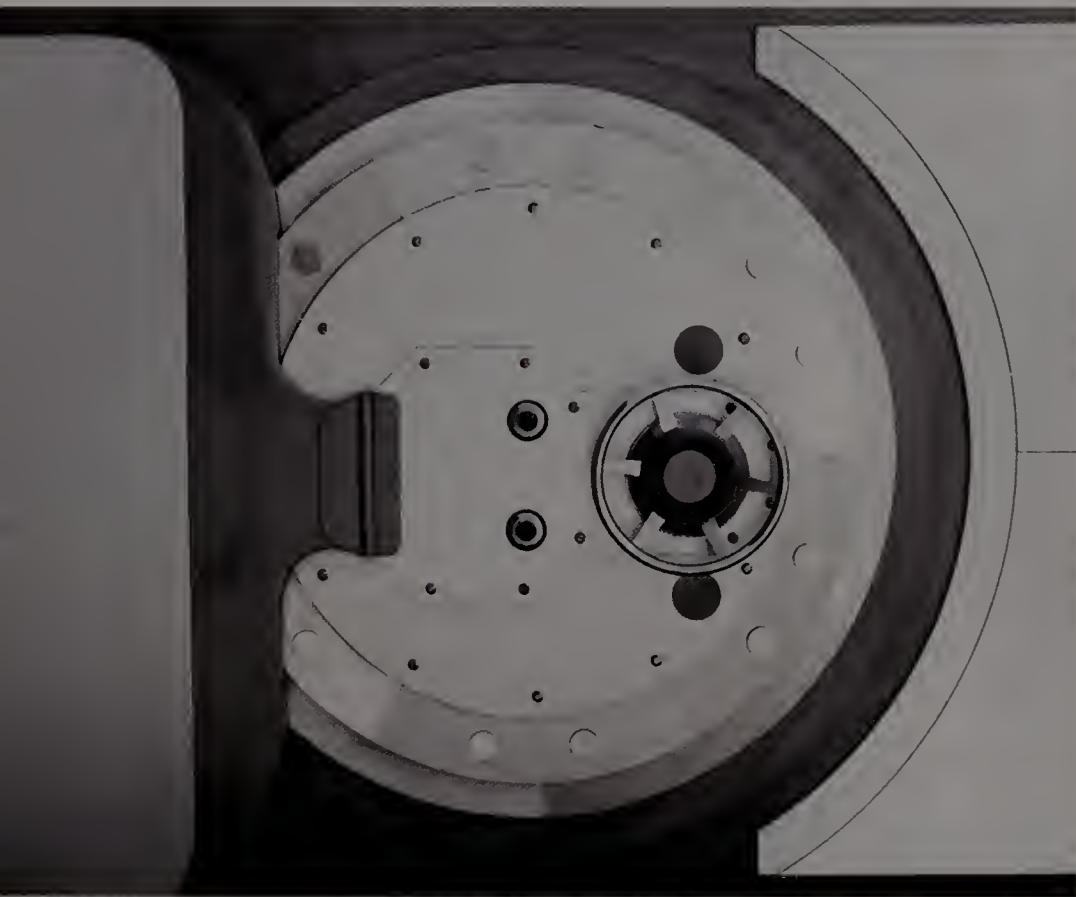
Another issue that may not yet be fully grasped at the board or even the executive level is the fluidity of the perimeter, which ebbs and flows with the tides of the business. The perimeter opens up for each new hire, contractor and business partner. It extends to e-business, outsourcing and supply chain strategies. It morphs with mergers and acquisitions.

The extended business environment has resulted in many business opportunities and great savings. "But in our quest for mobility and efficiency, we've built interdependent and interoperable infrastructures, creating choke points that need more security and redundancy," says security consultant Richard Lefler.

Perimeter defense has taken on new meaning. "It's not just about securing the building, nor about tightening up the network," says Lefler. The safety zone must also include global offices, partners and outsourcing vendors as well as Web-based commerce. It's no small task and requires strategic-level thinking.

Risky Business Litany of Regulations Raises the Bar For Business

Sarbanes-Oxley, the European Data Protection Act (EDPA), HIPAA and Basel II — complying with standards and regulations such as these is neither optional nor simply an afterthought. Indeed, with the stiff



allows the security group and business managers to adapt quickly to changing environments." Executives can't build security programs by looking in the rearview mirror, he says, nor can they predict the likelihood of the next terrorist attack or natural disaster. Rather, they need to create mechanisms for the influx and management of situational threat information.

Unfortunately, says Lefler, that influx is like "drinking water out of a fire hose." Executives need to implement tools to create relevancy in situational data, segmenting and automating

should all be held to the same best-hiring practices. But it doesn't simply end with the hiring. Monitoring activity is a must. Companies are reporting a notable surge in surveillance from both a physical and an IT perspective, says the CIO survey.

Physical security is maturing with the use of access-card systems, optical turnstiles and surveillance equipment. "However, these efforts are contradicted by what is happening in the world," explains Duke Energy's Frankovich. "Body-borne weapons can get through optical

penalties that accompany some regulations, compliance is now just as critical as any other core business or security initiative.

That means companies must become ever more strategic in how they implement and deliver compliance. Bill Boni, vice president and chief information security officer at Schaumburg, Ill.-based Motorola, Inc., says executives must upgrade their approach to security, which is often a matter for separate and sometimes conflicting fiefdoms. For instance, one set of professionals usually is responsible for the physical security of facilities, while another group oversees auditing and loss prevention activities, and yet another oversees electronic pass codes, firewalls, virus protection and all the other necessities of the information age.

But Boni says that approach is dangerous, advising a greater functional convergence — mirrored by his own expanded responsibilities at Motorola — that can break down the walls separating different elements of corporate risk management and security.

However, security consultant George Campbell says it is critical that upper management be on board. "The board of directors and CEO must assure that risk assessment around security-related issues is an integral part of the company's risk management process," emphasizes Campbell. Where organizations have put rigorous risk analysis and



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- **What are the points of access to our sensitive data?** Every location in which data resides probably allows multiple points of access. Identifying both physical and digital access points is the first step in securing them.
- **How is each access point protected?** Once you have identified the physical and digital points of access, examine how well each access point is protected. Using a single mechanism is a huge mistake. You need multi-layered protection.
- **Who has access to what data?** More than half of all security incidents involve insiders. Know who has access to what data. Increased access to sensitive data should only be given when both the "trust" and "need" criteria are met.
- **How do we track our sensitive data?** Auditing access to sensitive data is crucial. Audit logs are an effective mechanism, but they must also be considered sensitive data.
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mitigation strategies in place, he adds, "it's likely that much of the work toward compliance has already been done."

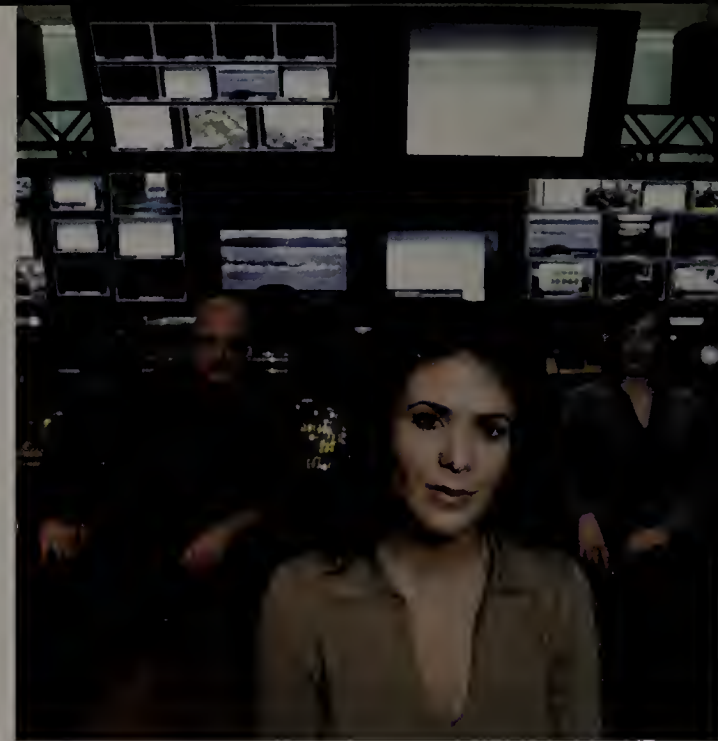
With or Without Mandates, Privacy Is Now a Pervasive Challenge

Privacy compliance is a large component of recent legislation and regulations. For instance, California law mandates highly onerous consequences for any security breach in which personal financial information is shared or disclosed without authorization. The law imposes penalties of \$2,500 per violation and there is no cap for willful violations of the law.

But privacy issues extend far beyond mandates alone. Long-term management efforts to foster a public perception of trustworthiness and strengthen brand identity can be quickly undone by revelations about mishandling private information. Furthermore, internal stakeholders may also have privacy concerns regarding the accessibility of their sensitive information.

In an article in *Information Systems Control Journal* entitled "Creating the Privacy-Compliant Organization," author Robert G. Parker points out that while each organization must consider the relevant privacy regulations, definitions created by the Organization for Economic Cooperation and Development (OECD) can provide the basis for developing a universal privacy model that outlines the basic principles for privacy compliance. However, he stresses, "becoming privacy-compliant is a process" that requires a compliance-focused team and infrastructure.

Tim Gladura, CSO of Cardinal Health, Inc., based in Dublin, Ohio, has full respon-



sibility for privacy issues and contends that the challenges are multiplied for his global organization. "We must look at privacy regulations around the world because we operate on seven continents," he says. Fortunately, he notes, as the central source for all security activities at Cardinal Health, "I myself have an enormous amount of compliance support on those issues, including a personal data protection and privacy person who is an international attorney."

Gladura emphasizes that a centralized and integrated framework needs to be put in place to monitor and control "whether or not an organization has done a responsible job" of protecting the privacy of its constituents. 🔒

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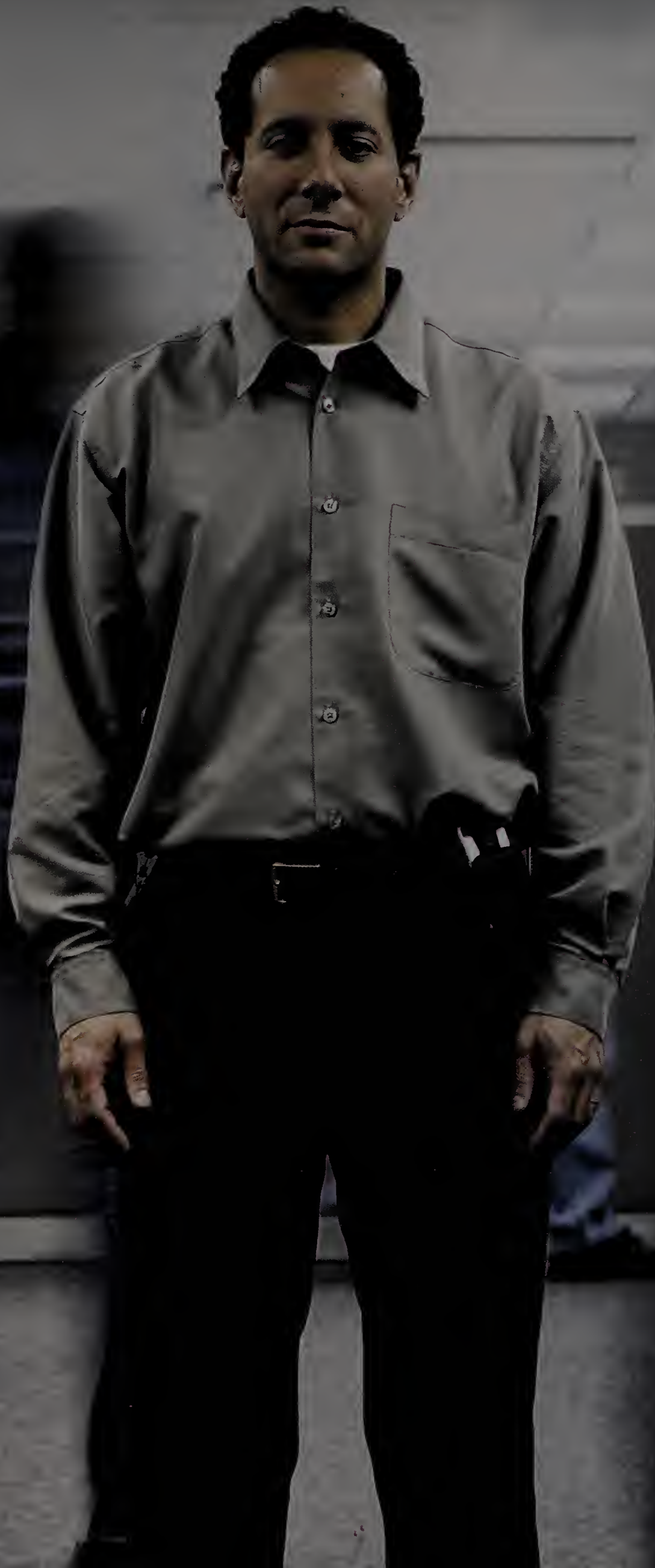
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According to **HUGH CUMMING**, CIO at ADP Employer Services, IT organizations often do not take a leadership position in the requirements process, instead taking the attitude that "the business is requesting it, so it must be the best thing to do."



Fixing the Requirements MIST

The requirements process—literally, deciding what should be included in software—is destroying projects in ways that aren't evident until it's too late. Some CIOs are stepping in to rewrite the rules.

BY CHRISTOPHER LINDQUIST

Hugh Cumming had his work cut out for him. The gap between what his not-yet-implemented call center management application at a large European company could do and the requirements list created by 40 eager business-side stakeholders now filled 3,000 pages and threatened to delay an already overdue call center consolidation effort another four to five years. "My first instinct was that the project had absolutely no chance of success," says Cumming, currently CIO for ADP Employer Services Canada.

Requirements, as every CIO knows, are a problem, but CIOs may not be aware of just how catastrophic the problem has become. Analysts report that as many as 71 percent of software projects that fail do so because of poor requirements management, making it the single biggest reason for project failure—bigger than bad technology, missed deadlines or change management fiascos. Though CIOs are rarely directly responsible for requirements management, they are accountable for poor outcomes, which, when requirements go bad, can

Reader ROI

- How a broken requirements process can sabotage software projects
- Ways to rewrite the process for success
- Software that can help monitor requirements for problems

include: project delays, software that doesn't do what it's supposed to and, worst of all, software that may not work correctly when rolled out, putting the business—and the CIO's job—at risk.

Mishandled requirements can torpedo a project at any time, from inception to delivery. Start down the wrong road and you arrive at the wrong destination. And even if you're heading in the right direction, making fumbling changes midstream can be almost as deadly. Not integrating require-

for projects; they don't use every means possible to guarantee that what they're building is what the user really needs, and sometimes they even fail to make sure that they're talking to all the right stakeholders.

In short, the traditional practice of requirements is broken. But some IT folks are doing everything they can to fix the situation. To a man, they say process is key. Exactly what process? They all have their own ideas. One executive decided to simply enforce rules that should have been

stripped down the scope of the consolidation project, lopping off existing processes that worked as-is and didn't need to be rolled into the new application. He also pared the group of 40 stakeholders to five active participants. He allowed the others to stay involved, but only in the more passive role of reviewing the implementation plan and feature specifications, without actually adding feature requests of their own. He then repeatedly went back to the remaining five stakeholders and asked them if specific requirements were really must-haves or simply nice-to-haves. After less than two months of pressing the issue, his new requirements list was less than 10 percent of the original. And after the project went into production, it needed to accommodate only one major change before being rolled out to 12 global locations.

Cumming says the problem in this case—and in many cases—is that IT often does not take a leadership position in the requirements process, instead taking the attitude that “the business is requesting it, so it must be the best thing to do.” But that kind of thinking can lead to requirements lists that are unmanageable and unforgiving. Instead, he says, IT people need to develop a valuable skill: saying no with a smile. “Really what you're saying is, ‘Not yet,’” Cumming says.

To paraphrase Daniele Vare, managing requirements—like diplomacy—is the art of letting everybody have your way.

When Cumming reduced his army of 40 stakeholders to five, he admits that there were some “interesting conversations” about who would stay in primary roles, noting that people were worried they were going to lose features they felt were important to their business units. To ease their fears, Cumming and the core stakeholders created a “high-level vision” (a summary of the most important functions) for the project and spent time demonstrating how the final project lined up with that vision. He also showed all the stakeholders how they would get at least some value from the project—even if they weren't going to get every single detail they wanted.

The more passive stakeholders were also encouraged to become more active as the

Analysts report that as many as 71% of software projects that fail do so because of poor requirements management, making it the single biggest reason for project failure.

ments with your test process can have you racing back late in the game to correct problems that might have been solved early on (and more cheaply).

It's up to the CIO to establish an overall requirements process that works and to support it with the political skills necessary to get buy-in from both the business and development sides. The CIO must also have the organizational backbone necessary to shove wayward requirements processes back into line.

None of this is easy. Business users often don't know exactly what they want, can't prioritize what they do want, request things IT simply can't deliver (because of complexity or cost), or can't describe their desires in terms that translate accurately into code. On the IT side, analysts, architects and coders regularly try too hard to please and don't set realistic expectations

enforced all along. Another rewrote the rules from the ground up. And a pair threw out the old rule books completely, one taking a business-process-focused approach and the other choosing to build applications with quick iterations rather than long requirements documents. But they all agree that you should choose a formal requirements-gathering process and stick to it.

Writing requirements is hard. It will always be hard. But with a handful of smart decisions you can create a requirements process that will produce positive results—and maybe keep your next project from becoming another statistic.

Forty's a Crowd

Cumming's solution to his requirements nightmare was radical surgery. First—with backing from ADP's chief executive—he

Guardrails to a Good Process

"TOOLS NEVER FIXED a software problem," says Richard Chennault, enterprise architect at Kaiser Permanente. But when it comes to managing the requirements process, tools can be a help—assuming good processes are already in place.

Whether you subscribe to the Rational Unified Process and own the complete suite of Rational applications or simply piece together your own toolset from smaller vendors such as Borland and iRise, tools can act as bearings and guardrails to help keep your requirements process moving and on track. Some examples:

- **The Framework for Integrated Test (FIT)** developed by Ward Cunningham (who also invented the community-edited online Wikipedia), is a platform where requirements are literally written as tests—for a requirement to be met, the test must pass. And FitNesse, which puts a wiki-like interface on the FIT methodology, allows business users (or more likely business analysts) to enter requirements into a spreadsheet interface that automatically produces test cases for later testing.
- **Source's Proveness** (used by Bank of Montreal) lets customers and business analysts produce simulations and tests before any code gets written.
- **Steelcase Calibre** (used by ADP) is a requirements-management tool that breaks requirements into functional and nonfunctional (qualitative) buckets, creates graphical storyboards of requirements and generates test documentation.
- **Telelogic's Doors** (used by Bank of Montreal and Procter & Gamble) integrates with Mercury Interactive's TestDirector for automated testing.
- **Rise's iRise Studio** lets companies create rich prototypes of applications, allowing, if not functional tests, at least visual confirmation that requirements are being accurately modeled. "Short of having a simulation, you will get to the testing phase and have misrequirements," says David Nix, vice president of online banking at Suntrust, an iRise user.
- **Borland's Jazzer** (used by Kaiser Permanente) allows simplified requirements modeling.

But, while all these products can simplify the requirements in your life, "you have to focus on process first," says Chennault. "You can do all this stuff with a notepad and a pencil if you have a great process." —C.L.

call center system began rolling out. When the system moved into their departments, these stakeholders became directly responsible for sponsoring any necessary application changes within those departments. This task was assisted by the intense interest that senior management had in getting the project into production. Cumming felt he needed to know who really wielded

influence in the company (versus what appeared in the org chart), plus he wanted to identify stakeholders with sufficient technical expertise to add value to the requirements-gathering process.

"The list of people who would have the most to contribute to a requirement list always ends up being small in my experience," Cumming says.

The Rules of the Roles

Tired of his company's hodgepodge of requirements practices, Jesse Hanspal, director of development technology services at Bank of Montreal Financial Group, decided to create his own process by combining pieces of existing requirements techniques and adding a quality assurance process as well. Hanspal says that after five years of effort, the bank has defined the requirements process at a level of abstraction high enough that it can be applied to any project or problem. After much consideration, the bank decided that it needed a process built around responsibility and job roles in order to guarantee that all necessary stakeholders had a say.

"It's important to get all the stakeholders around the table and get the requirements from the horse's mouth," Hanspal says. And, he adds, by defining stakeholders according to their roles, you get a more accurate cross-section. For instance, he says, for a given project, you need representation of the end user role, of course, but also of the application administrator role, not to mention roles related to security and regulatory compliance.

Hanspal notes that in the past IT spent 10 percent to 20 percent of its time and energy on defining requirements. "What we've learned is that once you have defined a process, then you go and get an ISO 9000 certification for that," he says. Having the certification lets people know what is required of them. It also gives the bank a chance to evaluate effectiveness and improve the process. And Hanspal says the new process has produced results. For instance, the number of software defects related to requirements has dropped by some 50 percent since implementing the new controls.

Bank of Montreal also wanted to make sure that its analysts had the skills necessary to execute the new process. Unfortunately, while it had been easy to find external certification for project management (the Project Management Institute) and functional testing (the Quality Assurance Institute), no similar body existed for business analysis. So the bank created its own. The International Institute of Busi-

ness Analysis now boasts some 800 international members, Hanspal says, and any company can send analysts for training in the Bank of Montreal approach.

Going Agile

Given the trouble companies continue to have with requirements, some practitioners argue that the process needs to be more flexible.

Gregor Bailar, CIO at Capital One, is a convert to one of these antiestablishment philosophies: agile development. Agile development

advocates argue that old-style requirements processes are too rigid, put walls between users and developers, and, given the ever-changing nature of software and business, are fated to fail. Instead, they say, developers and users should sit down together and start coding almost immediately, stopping frequently to evaluate progress and make necessary changes based on user input without feeling the need to follow a monolithic requirements document.

"What we needed wasn't more process but to get to the value [in a project]," Bailar says.

After piloting the concept in early 2004, Bailar began forming the ultra-lean, connected teams that are the basis of the agile method. Agile teams at Capital One generally consist of three businesspeople, two operations people, and five to seven IT folks, including a business information officer (in effect, a translator who works between the business and IT sides), a project manager and at least one of the 80 developers that Bailar sent to formal agile training classes. Along the way, some architects and security experts will add their skills as necessary. Each team gets its own agile coach (one of 20 Bailar hired) to keep an eye on the proceedings and offer advice and support. Teams meet in dedicated, open rooms, and initial requirements are limited to a goal for the project, a handful of cards with specific needs, and some models or prototypes for reference. Teams work together in close quarters throughout the project, and development stops regularly—perhaps three or four times in a typical nine-week development cycle—to assess progress and determine if changes are needed. Larger projects are built by breaking projects down into small pieces and assigning each subsection to an agile team (the method is sometimes called "swarming" in agile circles), with the overall progress controlled by a project manager.

To test the results of the system, Bailar took several in-development projects and switched them midstream from older waterfall-style development to "scrum," an agile technique that prescribes small, flexible groups that include developers and users and divides development into a sequence of 30-day "sprints." These sprints begin with a planning meeting and end with the group reviewing test results before the start of the next sprint.

He then tracked their progress against the historically expected progress of the older method, and he was happy with what he saw. Agile reduced development time by an average of 30 percent to 40 percent (sometimes nearer to 50 percent) while simultaneously improving the quality of the deliverables. He's sold, though he acknowledges that agile has its limitations.

"There are lots of things we don't use agile for," Bailar says, noting that the method

Capital One CIO **GREGOR BAILAR** is a fan of agile development, saying requirements gathering should focus less on process and more on the project's business value.



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excels where requirements are ambiguous and priorities are unclear, or for situations where you have the triple constraint of “faster, cheaper, better” but can’t afford to drop one of the three. For extremely large projects or those with very distinct and ordered requirements, Bailar says more traditional approaches are probably a better fit.

Every Line of Code Connected to a Business Process

Robert Sherman might not see it that way, however. Sherman, the strategic methods leader for IT at Procter & Gamble Pharmaceuticals, isn’t a huge fan of traditional approaches to requirements. He considers requirements only one of the first threads in a tapestry that includes everything from business processes to a finished software application. And unless IT managers begin to realize the importance of this interconnectedness, he warns, countless projects will continue to crash and burn.

Like ADP’s Cumming, Sherman had a requirements epiphany in the late 1990s. At the time, he was involved in an effort to standardize all of P&G’s 150 factories on a single factory-floor information management system. He and nine other experts at the company compared a 70-page specification written by the supplier to a 200-page requirements document written by P&G. Experts and vendor alike agreed that the document contained everything necessary for a successful project. It was concise. It was complete. It also “went to hell in a handbasket,” Sherman says.

Poking through the rubble, Sherman at first couldn’t understand what had gone wrong. Why had the seemingly ideal specification failed to produce a suitable application? He hired a contractor who spent two

months tracing every requirement to every relevant sentence in the specification. P&G found that 30 percent of the deliverables were not adequately addressed. And from what Sherman could tell, the misfires were a result of being too dependent on team members’ recollection of document comparison. The supplier had looked for common patterns that it could duplicate in order to reduce cod-

ing complexity. To Sherman and the others reviewing the specification, it looked—on the surface—as if those patterns matched exactly to the requirements. But they hadn’t. The problem, Sherman eventually decided, was that everyone involved had simply run up against the limits of their ability to comprehend extremely complex situations. The management tools they were using were



Robert Sherman, strategic methods leader for IT at P&G Pharmaceuticals, believes that going beyond a certain level of documentation in the requirements process leads only to more documentation instead of execution.

Robert Sherman’s vision was to trace requirements back to every affected business process to better gauge the application’s impact on the business **and to find hidden stakeholders.**



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also unable to make proper connections between deliverables and the actual business processes they would support—connections that would have highlighted the subtle distinctions that turned success into failure.

Frustrated with the inability of requirements management software vendors to address the overriding disconnectedness he felt was at the core of many development

seemed destined for failure thanks to a never-ending requirements process. By shifting midstream to the new schema, however, the project got back on track and now looks like it will be a success, he says.

The P&G schema has produced numerous side benefits as well, Sherman adds. For instance, an approach called “initiative scenarios” helps IT teams identify poten-

these work processes] and you understand the linkages back to the roles, you can get the clearance ahead of time—or kill the project if you don’t have the buy-in,” Sherman says.

The schema also has a dramatic impact on compliance. A too-restrictive view of regulatory issues can cripple projects in the pharmaceutical industry. A too-loose interpretation, meanwhile, could open the company to legal action. But previous requirements methodologies at the company relied more on gut instinct to determine the proper balance. Now, Sherman says, compliance experts can trace their legal requirements all the way from business process to final code to determine if regulations come into play. And the schema’s chartlike format and standardized sentence structure make it possible for just about anyone to trace a path, which helps users and developers prioritize requirements based on which ones will have the greatest impact on a business process.

Even so, Sherman says, successfully using the schema requires a couple of rules. Projects must be broken down into pieces. More complex applications can be built by combining these pieces, but Sherman believes that going beyond a certain level of documentation leads only to more documentation—and greater complexity—instead of execution.

Required Thinking

As these cases show, requirements processes must change, and CIOs need to drive the charge. Fixing your broken process probably won’t be easy or quick, so start now.

“Today, survival depends on game changing—certainly for IT it does,” P&G’s Sherman says. To change the development game, “IT is going to have to understand the intersections between requirements and business processes.” Failure to achieve that understanding could have dire consequences, he warns.

“If you’re not rewriting the rules of the game,” Sherman says, “then you deserve to have your job offshored.” **CIO**

Technology Editor Christopher Lindquist can be reached at clindquist@cio.com.

“It’s important to get all the stakeholders around the table and get the requirements from the horse’s mouth.”

—JESSE HANSPAL, DIRECTOR, BANK OF MONTREAL FINANCIAL GROUP

problems (not just this one), Sherman decided to build a system using his own schema and a collection of tools that now includes Visio and Telelogic’s Doors. The premise, he says, was simple: granular traceability. His vision was to be able to take a piece of code and quickly trace it back through the development process, back to requirements and then—rather than stopping there—map it all the way back to every affected business process to better gauge the application’s impact on the business and to find hidden stakeholders.

Getting to this point has taken five years and has required the IT team to gain an encyclopedic understanding of business processes, but the results have been worthwhile. Using complex pharmaceutical project lifecycle management tools as a benchmark, Sherman says he produced the application at one-quarter the cost and with fewer than 10 percent of the expected defects compared with outside development estimates. Sherman also helped another group in P&G apply the technique to a teetering ERP implementation that

tial enterprise-level stakeholders, with the aim of converting them to sponsors before a project even gets under way. Since every requirement links back to a business process, business-side stakeholders, developers, architects and analysts can trace their way through the organization, identifying groups that feel an impact from the new application, even if they weren’t the actual end users. As an example, Sherman points to an Electronic Lab Notebooking (ELN) application (a digital data collection tool for researchers) that P&G had been having trouble getting rolled out. Previous attempts at justifying and delivering the ELN limited the requirements analysis to the lab bench and the scientist who used the notebook. But Sherman was able to demonstrate a domino effect that showed how notebook data would affect acquisitions, divestitures, patent filing and more. As a result, the IT group was able to seek additional sponsors inside the organization, and the project is heading toward 4,000 users.

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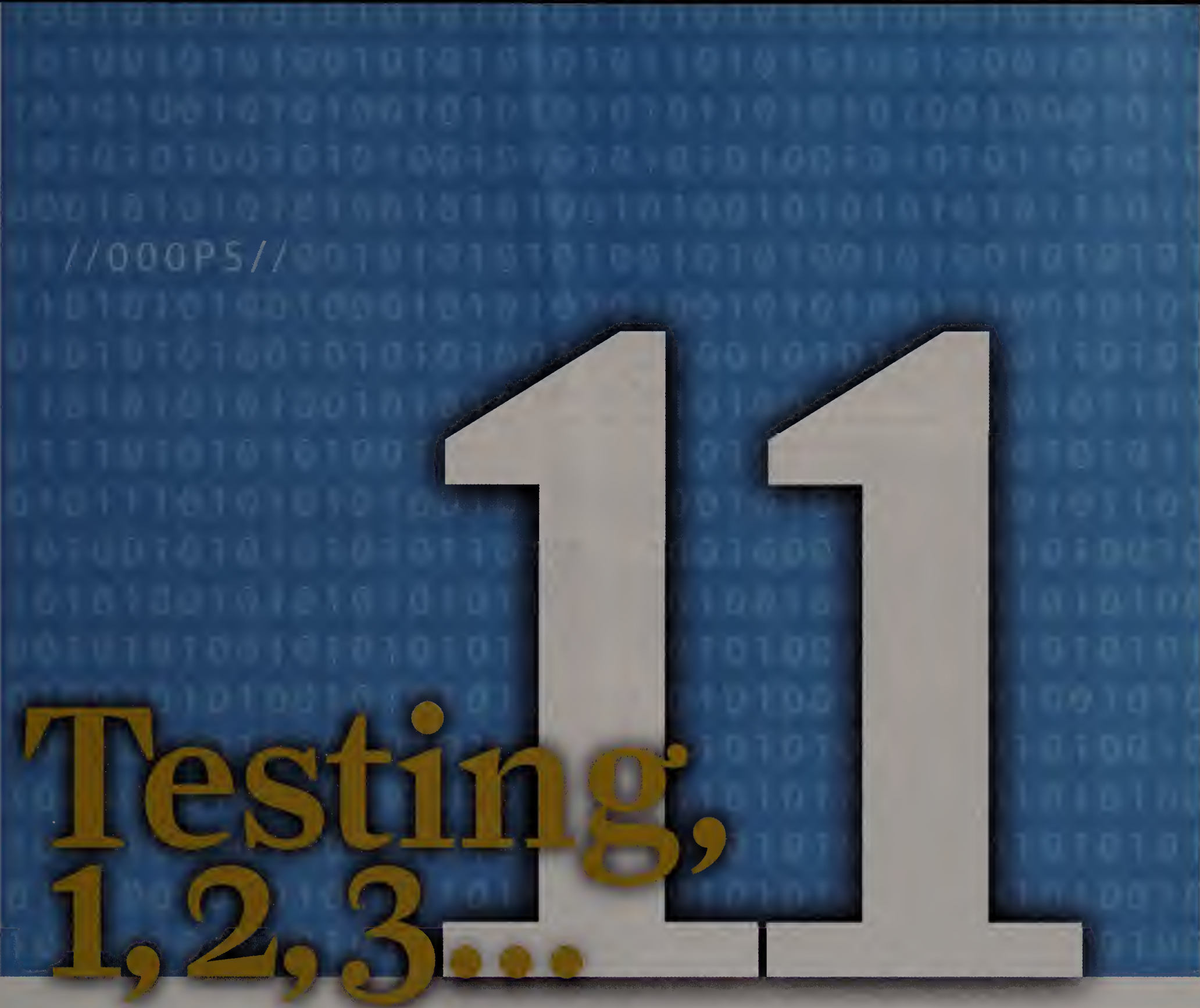
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Testing, 1, 2, 3...

Next to requirements, testing is the most overlooked, most underfunded, most rushed, yet most critical aspect of the software development cycle. Here are 11 ways to boost the level of success.

BY MERIDITH LEVINSON

Three years ago, Station Casinos came up with a great promotion to lure customers: \$25 worth of free slot play on their electronic loyalty cards. It worked like a charm too. Gamblers flocked to the casino in droves.

That should have been a good thing.

But one Friday night, shortly after the promotion began, when players inserted their cards into the slot machines, nothing happened. The sheer number of people trying to access the machines—at the same time the accounting department was running a number of financial applications—caused the servers that stored all the promotional information to freeze.irate, players threw their loyalty cards

on the floor and raised a ruckus.

That was a bad thing.

The source of the problem? Testing. Marshall Andrew, Station Casinos' VP of information technology and CIO, says Station Casinos never anticipated such an overwhelming response to the promotion. Consequently, IT did not test the system for such large volumes of activity, and certainly not while other programs were running. Station lost the cash they would have made that Friday, alienated customers and had to run another campaign to apologize; the casino invited some customers to return another weekend for \$50 worth of free slots.

The moral: Testing is essential to developing high-quality software and to ensuring smooth business operations. It can't be given short shrift; the consequences are too dire. Businesses—and, in some cases, lives—are at risk when a company fails to adequately and effectively test software for bugs and performance issues, or to determine whether the software meets business requirements or end users' needs. (See "The High Cost of Flawed Testing" on Page 66.)

"The important thing when you roll out a system is to make sure it works," says Andrew, who has made significant changes to his testing organization (known as quality assurance, or QA) since then. First, he changed the testing process itself. Previously, developers had a great deal of freedom to change code while it was being tested to keep the project moving. Now, there are tight controls on the developers' access

code. Your developers will respect them more, and they can code some of their own testing tools. "If the development organization and the QA organization don't respect each other, we won't be able to achieve our high-level quality goals," says eBay's VP in charge of QA, David Pride.

2] Colocate your testers and developers. Putting developers and testers together goes a long way toward improving communication between two groups that often lock horns (after all, testers are paid to find fault with developers' work). Physical proximity "facilitates the nuances of testing" that are best communicated through personal interaction rather than by e-mail or an application development workflow tool, says Pride.

3] Set up an independent reporting structure. Testing should not report to any group that's evaluated on meeting deadlines or keeping costs down for a project, according to John Novak, senior VP of hotel chain La Quinta. Having testers report to the development group is the worst choice of all, Novak says. If developers are behind or having trouble with code, they will be tempted to keep testers out of the loop. Instead, Novak has testers report directly to him. Andrew has testing report into his business analyst group as a way to foster communication and to get testers involved in the development lifecycle early.

4] Dedicate testers to specific systems. At Barnes & Noble, one group of testers focuses on store systems, while others tackle financial and warehouse systems. Barnes & Noble CIO Chris Troia says focus-

ing testers on one set of systems deepens their understanding of how those systems are supposed to work and gives them the expertise to identify problems that might not show up in a formal test document. eBay takes the same approach, but goes one step further. The company has three distinct testing groups: one for site functionality, one for payments and one for data warehousing applications.

5] Give them business training. Station Casinos' Andrew makes members of his testing department work the front desk, the casino floor and in different corporate departments so they can learn the lingo and better understand the systems they're testing. (Most of his 125-person IT staff had never placed a bet on a sporting event at a casino prior to joining the company.)

6] Allow business users to test too. Most testing involves banging on systems and fiddling with code—technical stuff—which can tempt IT to leave business users out of the loop. Bad mistake. At

Businesses—and, in some cases, lives—are at risk when a company fails to adequately and effectively test software.

to test code. To keep everyone honest, Andrew had the QA specialists begin reporting to the business analyst group rather than to the development group, whose work it was evaluating. Next, he hired more QA specialists—with business training—and involved them in the development process earlier, when business analysts are creating requirements documents, so that they can then develop test scripts based on business specifications right from the beginning.

The following list of best practices for testing software and running your testing organization were gleaned from interviews with companies that have rigorous testing needs and standards. These tips go beyond the "test early and often" mantra and will improve your IT organization's testing capabilities—not to mention the quality of the software you release.

1] Respect your testers. In many companies, testing is an entry-level job. As a result, testing isn't done well. Instead of hiring people off the turnip truck, recruit candidates who are detail-oriented, methodical and patient. Look for people who know how to

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La Quinta, “the testers are always coming out of the business community,” says Novak, to ensure that the systems IT is developing meet their specs. For some applications, especially those that run in hospitals, getting end users to test applications is a matter of life and death. “Technology people can only go so far,” says Patricia Skarulis, vice president of information systems and CIO of Memorial Sloan-Kettering Cancer Center. “We need to have users involved.”

7] Involve network operations. Nate Hayward, vice president and director of quality management with HomeBanc Mortgage, says that during testing, his company’s network operations group uses a software tool (Compuware’s Server Vantage) to monitor servers for performance issues that could originate from the way hardware or software is configured. Involving the network operations experts in testing also gives them the opportunity to rehearse a deployment before a system goes into production, ensuring that the actual implementation will proceed smoothly.

8] Build a lab that replicates your business environment. Four years ago, Station Casinos built a costly test lab that looks like a minicasino with slot machines, point-of-sale terminals and Web-based kiosks that simulate the computing environments at all 13 of Station Casinos’ properties. Ninety percent of the applications the company runs, including wireless apps, are duplicated in the test lab. For the other 10 percent of applications, which are too big or complex to create an exact testing replica, Andrew comes up with a scaled-down subset of the app to predict how it will run when it’s fully rolled out. Or he gets help. With Station Casinos’ last system rollout, he used Microsoft’s test labs to run simulation models.

9] Develop tests during the requirements phase. Companies traditionally have waited to do testing until requirements have been established and coding has begun—or finished. A growing school of thought says that testing can still be done effectively even if the requirements have not been developed fully. Fans of “agile programming” (see “Fixing the Requirements Mess,” Page 52) believe that testing should be done continually from the beginning of the project until the end.

10] Test the old with the new. EBay uses a statistical analysis tool it built in-house to compare defects discovered by testers to the code that was tested during a particular testing cycle. The goal is to make sure that previously tested pieces of software still

work properly when new features are added. Pride says the statistical analysis tool pinpoints where testers need to add test cases in the current project and also helps determine the overall effectiveness of current regression tests for forthcoming software projects. EBay needs to continually refine the tests because some new projects may contain the same functionality as previous projects. The better those tests can be, the better future projects will be.

11] Apply equivalence class partitioning. This is a mathematical technique that testers can use to identify additional functional requirements that business analysts and users might have overlooked or not articulated, says Magdy Hanna, chairman and CEO of the International Institute for Software Testing. He says equivalence class partitioning gives testers a clear picture of the number of test cases they need to run to adequately exercise all of a system’s functional requirements. Pride says equivalence class partitioning is one way his group can determine all the ways in which eBay’s 157 million users might use its online auction platform. **CIO**

Senior Writer Meridith Levinson can be reached at mlevinson@cio.com.

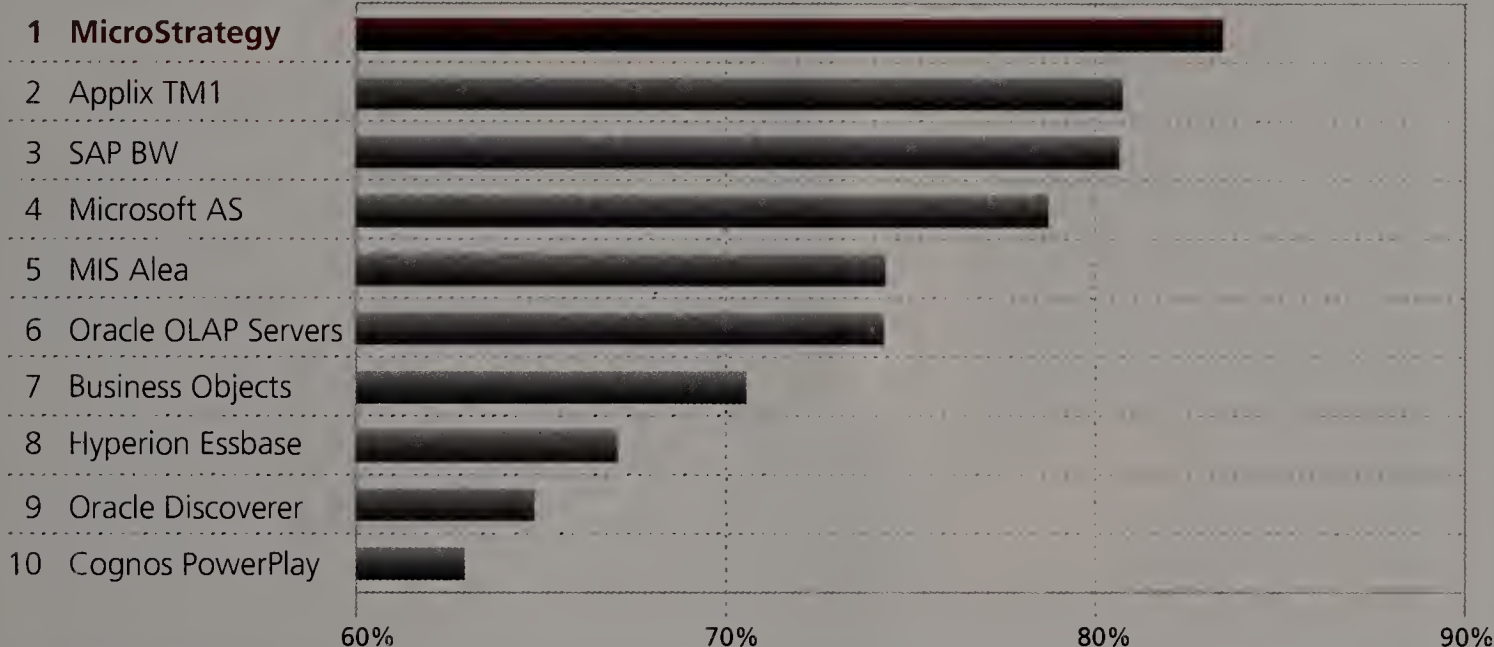
The High Cost of Flawed Testing

A brief, sad but instructive history of futility and failure

- Bugs in connections between **Hewlett-Packard’s** legacy order-entry system and SAP systems caused a backlog of customer orders for servers beginning in June 2004. The computer problems and resulting backlog cost the company \$40 million in lost revenue.
- A failure to test for specific conditions contributed to the **August 2003 blackout** that affected much of the northeastern United States and parts of Canada.
- Insufficient testing was one of the causes of **Nike’s** failed **i2** demand forecasting software implementation in June 2000, which reportedly cost the company more than \$100 million in lost sales.
- **EBay’s** 22-hour outage in 1999 prompted the online auctioneer to reengineer its technology organization, including systems architecture and development, and testing approaches.
- Glitches in the software controlling **London’s emergency response system** (London’s version of 911) resulted in ambulances being dispatched to the wrong locations and citizens not getting proper medical care in a timely manner in 1992.
- During the 1980s, the user interface of a **computerized radiation therapy machine**, the Therac-25, was not adequately tested, and undetected bugs in the device’s radiation administration engine made it possible for technicians to program the wrong doses of radiation. As a result, several patients died or sustained serious injury from overexposure. —M.L.

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Wayne Luthringshausen, chairman and CEO of The Options Clearing Corp., wanted his IT group to stop putting out fires and move forward with a new system to help the company keep up with its clients' changing technology.

KEEPING UP WITH THE MERRILL LYNCHES

The CEO of The Options Clearing Corp. knows his company lives or dies by the strength of its IT. Maybe that's why he isn't so hung up on cutting costs and hitting deadlines.

BY BEN WORTHEN

WAYNE LUTHRINGSHAUSEN is chairman and CEO of The Options Clearing Corp. (OCC), a clearinghouse for options, futures, derivatives and other complex financial trades. The company, which is jointly owned by some of the country's largest options exchanges, processes over 5 million contracts on an average day. Its customers—approximately 130 financial services firms—can't put up with any downtime. Luthringshausen depends on IT to get this done. "Our systems, the hardware they operate on and the wires that connect them, that's our factory," he says. "We don't have a business without it." Correspondingly, IT employees make up almost two-thirds of the company. In April, OCC went live with a fourth-generation transaction processing system that cost \$100 million and took five years to install.

Luthringshausen needs to get his budget approved—and ultimately provided—by his customers. As a result, a large part of his job is to serve as an intermediary between IT and those clients. Luthringshausen spoke with *CIO* about how he fulfills that role and works with his executive team, including the CIO. He also offers some surprising insight on how CEOs view IT expenditures. Hint: Coming in on budget is not always the be-all and end-all.

CIO: Do you find yourself having to defend your IT department to your customers?

Wayne Luthringshausen: That's how I've viewed my job all along. If IT screws up, I'll tell my clients that we've screwed up and we're going to solve the problem. But the other side of it is that I don't think my board should be beating up on my IT folks. I have to be an advocate, because we're doing a good job. For example, I went to a bar one night after a function, and one of our clients was there. He yells down the bar at me, "Luthringshausen, you've got the lousiest IT operation anywhere in the world!" That took me aback—it's not the best way, but it's one way to get feedback. The issue, it turned out, is that every night we process the day's transactions, and our agreement is that we get the results to our clients by midnight. So we've built our system to be able to deliver

on a peak night, when the volume is substantially higher than average. As a result, most nights we deliver around 10 p.m. When that night comes where he gets them at 1 a.m., in his mind, I've missed.

As the CEO, how do you stay on top of complaints like that, as well as ones that address fundamental weaknesses with your IT?

There are two ways. Our clients, the Merrill Lynches and the Goldman Sachs, are very technologically astute, and if we fall too many technology generations behind them, we're not going to be able to provide the kind of information services they need in order to trade. So for me, it starts with noticing that our customers want to do more and realizing that we can't do those things inexpensively and efficiently.

For example, options expire on the third Saturday of every month. It's a busy day, and there's usually a heavy volume of transactions. Over that weekend we reconcile all the transactions that were made and expire all the contracts that aren't exercised. Everybody in the industry works that Saturday. Well, our old system was a dumb terminal, so if you worked for Merrill Lynch you had to go all the way downtown to use the machine for what really is just a half hour of work. So of course everyone was asking, "Why can't I



The Options Clearing Corp.
Headquarters: Chicago
Primary business: Processes and settles options for financial brokers
2004 net income: \$47.4 million
IT executive: John Von Stein, CIO

just get on my laptop at home and log on to a website?" When you get enough questions like that you start to realize that you're out of touch with your clients and the way they're conducting business. That's when I start to look at redoing the systems.

I also look for internal things. Our U.S. options volume has been growing at 20 percent a year, and the bigger it gets, the more recognizable our problems become. And the ramifications are bigger when you're doing 5 and a half million contracts a day than when you're doing a million. We have about 50 quality standards to help us measure how we are doing. If we miss one, odds are I'm not going to hear about it. But you miss two, or miss one for several months in a row, everyone hears about it. Suddenly you're not just dealing with a miss, you have a weakness you have to address. People come to me with money requests, because we need to add this or that. We make a lot of changes, we've fixed this, fixed that, patched here. One day, you sit up and you say, "Guys, it just seems like our systems aren't what they ought to be for the kind of business that we're doing today. Let's take a look at that."

Was there a specific moment that you knew it was time for a new system?

There wasn't a particular incident, it was more a series of incidents and events that get you to a point where you realize you have to move on. What I noticed was that our technology management group had become much better at putting out fires than at creating [new systems]. You get to a point where you are patting people on the back for having gotten you out of trouble last night, when it is partly their fault that you had the problem because they are not ready to move on. When someone has worked on something for so long, it can become their baby. Instead of

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“I’d rather spend \$100 million and have the new system work than spend \$75 million and not have it work.”

—WAYNE LUTHRINGSHAUSEN,
CHAIRMAN AND CEO,
THE OPTIONS CLEARING CORP.

thinking about the next baby, they can only think about fine-tuning the current one. That’s the epiphany that I came to.

As we were moving along [with Encore, the new transaction-processing system that went live in its entirety in April], it became apparent that we needed to move the project out from under that management group. They did an awesome job of making the old system run a long time, but they had gotten into a defensive mode, and it is hard to do a major project when the whole management team is like that. I had to move the old CIO out, and we had a strategic executive manage the project for a while. We wanted to get rid of as much negative energy in IT as possible before we brought in a new CIO. We wanted someone who could come in with a fresh view. When we hired the new CIO [a year and a half ago] he walked into the middle of the project.

Encore was a five-year, \$100 million project. How did you stay on top of it, or did you leave all of that to the CIO?

During Encore, I went over what was working well and what was going poorly at least once a week with the project manager, the COO and the CIO. Also, my CIO’s office is catty-corner to mine. We see each other every day, and he would have to make a real concerted effort to hide something from me. I also hired an auditor to come in and do some checks for our board. We wanted to get an outside opinion on what was working, what wasn’t and where we had more risk than we should have. We got that report every couple of months. It was a check-and-balance for the board.

You know what though? We hired the wrong guys [as auditor]. They reported things as being in trouble that weren’t in trouble. So we had to get another auditor in to

audit the auditor. If you hire the right people, it’s a great way to get an independent view, to find out if your people are lying to you. In our case, our people were clearly telling us the truth, and in the end we found that out.

Your customers depend on you to keep your systems up all the time. As the CEO, how did you ensure that you could stay up while doing a major upgrade like the Encore project?

For me the most important thing is the soundness of our business. And it’s my job to set the tone for that—for example, saying to the CIO that if the system goes down we need to be up and running in two hours. When we decide to take risk—and putting in place a new system is definitely a risk—we have to mitigate it as best we can with all the additional processes, resources, checks and balances, testing and double-testing it takes so we are confident that the thing’s going to work when we start to use it.

I hear about organizations that are doing these big systems that run into all kinds of problems. I’d rather go into the boardroom and say, “Guys, if we were a for-profit company, we might try to do it for \$75 million. But it’s going to take us \$100 million.” Because we have to be absolutely certain it works, and I’d rather spend \$100 million and have it work than spend \$75 million and not have it work, and then have to spend another \$100 million to get something that actually does. I never like to brag about IT, because it comes back to bite you, but with Encore, every one of our installs worked. And now that they are in full-time production, they still work. I think the reason is that we said we’re going to spend more money at the front end of this thing to make sure it works.

But CIOs are trained to try to deliver on time and under budget. Are you advocating a mind-shift?

Our CIO came from a larger company with a much different kind of environment, and it took him a good six months to recognize how we look at this stuff. When he first came in he’d say, “Hey, I want to get this thing done in half the time,” but he’s sitting in a room with a bunch of people that have been here for five years and can say, “Whoa. Could I just talk to you, sir?” It sounds unbelievable, I guess, but remember, I’ve been here for 35 years, and this culture’s been around for 35 years. I want my CIO to know that his focus shouldn’t be on profits, it should be on pulling off a project safely and soundly. So, yeah, the cost for us is probably a little higher, but we accept that within certain parameters. Over the years you get a pretty good sense of when the cost is wacko and when the cost makes some rational sense.

On April 15, which is just after Encore launched, you guys processed 11 million contracts, which is double an average day. Were you nervous?

The system went live in phases, so it wasn’t all brand-new. But we knew we were going to be stressed during the day since volume for everything was up. It was all-hands-on-deck—we sat there watching the CPUs. We got hit pretty heavy, but we handled it. And nobody knew we were staring at the computer. Our view now is that we are headed to that kind of volume more regularly. And we won’t have any problem handling it. **CIO**

Senior Writer Ben Worthen can be reached at bworthen@cio.com.

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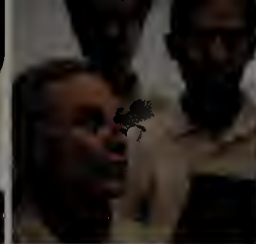
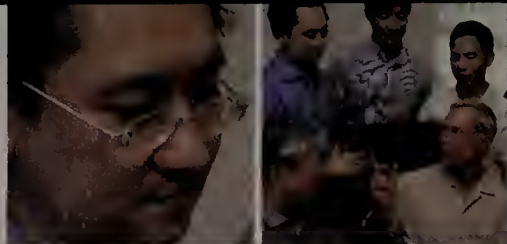
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A CISR-CIO STUDY

Part 2 of a three-part series about outsourcing strategies and success models, defined in original research by MIT's Center for Information Systems Research and CIO.

Working with offshore partners requires CIO oversight and strong capabilities on both sides

The first time Farrell Delman out-sourced application development to an IT services company in

India, the relationship was far from the mutually beneficial partnership he had hoped for. As president and CIO of the Tobacco Merchants Association (TMA), an information aggregator and distributor for the tobacco industry, Delman needed an outsourcer to develop a content management system to handle the organization's ever-growing library of electronic information. So in 2000, he signed a contract with a large IT services provider in India that said it could complete the project for just \$256,000, instead of the \$1.65 million it would cost TMA to do the work in-house.

Unfortunately, the outsourcer had little experience with content management systems, Delman says, and developers spent much of their time learning on the job on TMA's dime. The outsourcer had underestimated the amount of work it would take to develop the application and, therefore, had underbid, he says. "A lot of what they considered their 'design' of the application amounted to attempting to fit round pegs into square holes in order to save time and money," recalls Delman. The size of the vendor was also an issue. It had several big customers, but TMA wasn't one of them.

Despite frequent trips to India, Delman felt ignored. What attention was paid to TMA was focused solely on coding, he says. "The people assigned to the project were very skilled in IT, but they didn't spend a lot of time getting to know our business model," says Delman. And given that TMA's business depended on this content management system, that was a problem.

Ultimately, the project came in on budget. But that was the only bit of good news to be had. The project took seven months longer than expected to complete. The content management system was not aligned with the business needs of TMA and lacked the flexibility Delman was seeking, he says. And ongoing maintenance for the application proved difficult and expensive.

Delman's experience is not unique. He was attempting to pull off what Jeanne W. Ross, principal research scientist at MIT's Center for Information Systems Research (CISR), calls a "co-sourcing alliance," in which client and vendor jointly manage projects—usually application development or maintenance work that goes offshore. Unlike outsourcing deals in which a CIO hands off a discrete piece of com-

moditized or repeatable work to a vendor—what Ross terms a transaction relationship—co-sourcing alliances rely on a symbiotic relationship between client and vendor. (To learn how CIOs should approach transaction relationships, see "Simple and Successful Outsourcing" at www.cio.com/100105.)

Co-sourcing works out for the client 63 percent of the time, according to a recent study by CISR and CIO. Transaction relationships, by comparison, have a 90 percent success rate. (A third type of outsourcing identified in the CISR-CIO study, strategic partnerships, works out half the time but goes sour in the other half of cases.)

The mistake that CIOs such as Delman make with co-sourced projects is failing to set them up as partnerships in the truest sense of the word. Co-sourcing, which draws on both the vendor's specialized technical knowledge and the client's deep business knowledge, succeeds only when both parties have strong capabilities and the relationship is set up so that those capabilities can mesh for the greater good. Co-sourcing that is treated like anything but a team sport is bound to fail, says Ross. Delman says his vendor did not bring the right technical skills and brushed aside the client's knowledge of the business. The project was a bust.

Despite less than stellar success rates, CIO interest in co-sourcing alliances remains high. And why not? Done right, you can gain access to a vendor's highly trained technologists and project managers when you need them, while actually saving money and retaining a level of management control. The trick lies in setting yourself up for success. CIOs who want to make co-sourcing work must first ensure that both they and the vendor have the right capabilities, then set expectations and

Reader ROI

- ❖ Why co-sourcing alliances fail 37 percent of the time
- ❖ The three must-dos for a successful co-sourcing alliance
- ❖ Why offshoring relationships take a long time to develop



To keep his outsourcing alliance with Zhejiang University on track, State Street CTO **Jerry Cristoforo** (at computer) regularly visits Hangzhou, China, to collaborate with Zhejiang faculty including (clockwise from upper left) Greg Au-Yeung, Bo Zhou, Xiaohu Tang, Jianling Sun and Zhijun He.

BY STEPHANIE OVERBY

OFFSHORE ALLIES

governance processes for a mutually beneficial alliance, and finally revisit those expectations and management rules to sustain value throughout the relationship. It may not be easy, says Ross, but "it's totally achievable."

Getting to Know You

After the missteps with his first attempt at a co-sourcing alliance, Delman took some time to make sure he had his footing the second time around. As maintenance on his content management system grew more onerous, he once again sought out an outsourcer. His ultimate goal was to create a new, more flexible application to manage content,

which approached 3GB in 2003. But he didn't jump into another development project with a vendor. Rather, he hired Cordiant to maintain the application that the previous outsourcer had developed. Cordiant, based in Kochi, India, spent more than a year doing maintenance on the system before even considering the development of a new system.

That's how Delman avoided the snags he had had with the previous co-sourced development project. "By doing maintenance, [Cordiant] learned what the system was about in terms of content, and they were able to see how it could be streamlined," he says. "The maintenance period also gave them time to smooth out potential problems. "It was a good way to find out what the communication levels were. You find out if when you say blue, they see the same blue. A lot of

The Sweet Spot of Outsourcing

Report from MIT CISR BY JEANNE W. ROSS AND CYNTHIA M. BEATH

IT executives entering into IT and business-process outsourcing arrangements seek a variety of benefits, including cost reductions, variable capacity and reduced management time spent on IT. But outsourcing succeeds only if the vendor, as well as the client, achieves expected benefits. Often client and vendor interests are not aligned. How can clients and vendors settle into a "sweet spot" where their interests coincide? New MIT CISR-CIO research has examined 90 outsourcing deals in 84 companies to help executives recognize opportunities for long-term benefits from outsourcing relationships.

The research found that the outsourcing sweet spot depends on the nature of the client-vendor relationship. There are three types of outsourcing relationships: **1.** a transaction relationship in which an outsourcer executes a well-defined, repeatable process for a client; **2.** a co-sourcing alliance in which client and vendor share management responsibility for project success; and **3.** a strategic partnership in which an outsourcer takes on responsibilities for a bundle of client operational services.

The first article in this three-part series explored transaction relationships. This article focuses on co-sourcing alliances, describing how responsibilities are shared between the client and vendor, the value that each party seeks and the inherent tensions in the arrangement.

How to Maximize Value from Co-Sourcing Alliances

In a co-sourcing alliance, clients and vendors share management responsibilities, usually for application project initiatives. They draw on both the vendor's specialized technical skills and the client's deep business knowledge.

Client interest in co-sourcing arises from the desire to access lower-cost but higher-quality technology and project management expertise while maintaining control over the project. Vendors seek to develop industry and application knowledge as they deliver expertise at a cost that often mixes local and offshore labor rates. When the client and vendor both have strong capabilities, they create a mutually beneficial arrangement.

The contribution of the outsourcer in a co-sourcing alliance is difficult to isolate from the contribution of the client's employees. For example, Dow Chemical, which deploys project teams with, on average, four vendor employees for every internal team member, has a set of metrics to assess team productivity on factors such as function points. But ultimately, Dow CIO David Kepler notes, the measure of success for the outsourcing arrangement is the project outcome. He considers his alliance a success because alliance teams consistently deliver high functionality on time and on budget. Kepler does not know—or care—whether outcomes would be different if the vendor were not involved. He has an afford-

able variable staffing model that works.

Co-sourcing alliances present risks to both clients and vendors. For clients, generating value requires relying on vendor expertise, but too much reliance can result in insufficient internal knowledge to apply new technologies effectively. Vendor risk results from the need to teach project methodology to the client. Vendors run the risk of working themselves out of a job as they strengthen their clients' skills.

Understand the Three Types of Outsourcing Deals

Companies can become competent in all three types of relationships. It is important to match specific outsourcing needs with the appropriate type of relationship.

Clients managing transaction relationships as strategic partnerships incur expensive and unnecessary overhead. Co-sourcing that is treated like anything but a team environment is sure to suboptimize outcomes. And clients and vendors in strategic partnerships who refuse to regularly renegotiate will become embroiled in bitter contract battles. In all outsourcing relationships, both client and vendor should target the sweet spot to maximize benefits.

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Outsourcing

learning happened in that maintenance phase."

When it was time to start development on a new system in June 2004, both client and vendor were in agreement about what would work best for TMA. Cordiant began work on an open-source content management system. Within seven months, Cordiant completed the

Farrell Delman, CIO of the Tobacco Merchants Association, views his outsourcer as "my own internal systems department."

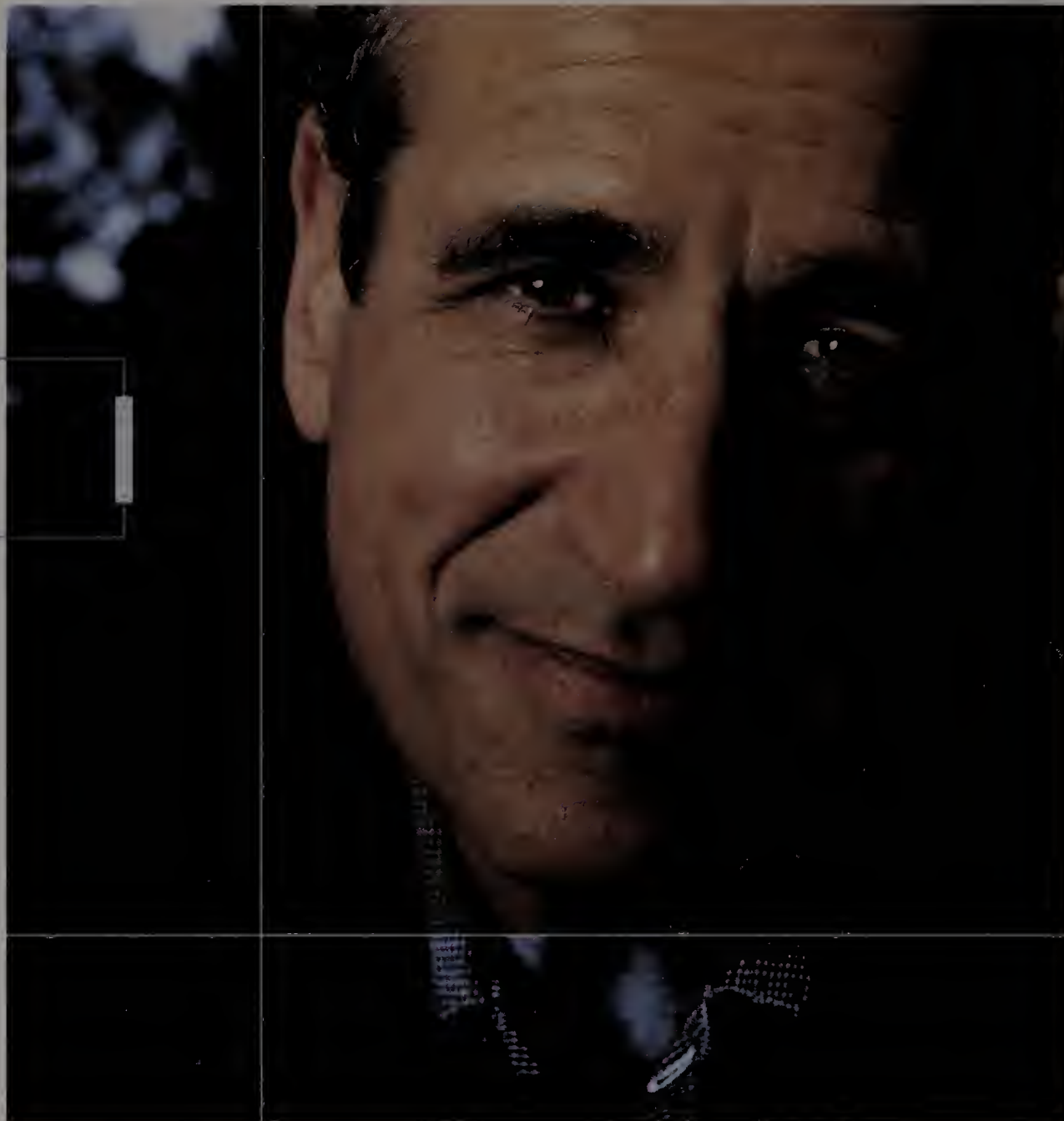
system for \$300,000; Delman estimates it would have cost \$2 million to do in-house. But more importantly, the company delivered a system that met TMA's needs for a dynamic content management system in full. And that's saying a lot for Delman, who by his own admission is "a little obsessed about [the] applications" on which TMA's business model hinges. "If they don't work," he says, "we don't sell."

Delman expects to renew the contract with the outsourcer in 2007. "What I have with Cordiant is the relationship I would have with my own internal systems department," he says. "In fact, I view them as my own internal systems department."

TMA's second attempt at co-sourcing worked well because Delman chose the right partner and allowed time for the two companies to learn one another's capabilities and needs. Ross explains that "if you start small and take the time to learn how to do it, co-sourcing can be a natural to help CIOs access IT talent at lower offshore rates while making better use of their internal staff."

At State Street, the seeds of a successful co-sourcing alliance go back a quarter century. Jerry Cristoforo, State Street's CTO and executive VP of enterprise information and global markets technology services, formed a relationship with Zhijun He, the founder of the computer science program at China's Zhejiang University, way back in 1980. Fast-forward 25 years and State Street has developed a co-sourcing alliance with UniverseSoft Technology, an outsourcing company spun out of the university that is dedicated to application development and maintenance for the Boston-based financial services company. State Street owns 81 percent of the company, the university 19 percent.

Before the company was formed in 2003, State Street used the university's PhD candidates for R&D work. Although his relationship with He had been close for years,



Cristoforo knew he had to take some time to develop the alliance between State Street's IT staff and business users and the student-developers in China. In 2001, three Zhejiang professors spent nine months in Boston working with State Street's development managers, getting to know the business and taking on several long-term technical projects as project managers. Development was done back in China.

Soon after, State Street ran into a problem with its trade-execution software. The company had acquired the system in 1997 in anticipation that the transition management business (which has to do with high-volume asset reallocation) would take off. It didn't, and the employees who knew the system's inner workings ultimately left the company. In 2002, transition management activity suddenly went through the roof, but the software supporting it was no longer current. It went from crashing once a year to several times an hour, and there was no one around with the knowledge to fix it.

Cristoforo realized he had a solution at hand: the developers at Zhejiang. There was no doubt they were talented. The only question was whether they could fix the problem fast enough, since they'd previously worked only in R&D mode. But the combination of the techni-

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cal minds in China and the business knowledge in Boston, linked by the project managers in both locations, resulted in success. "In 10 months, we were in production with the new system," Cristoforo says.

Zhejiang was a great resource for State Street, but not a permanent one. "When we did that project, all of a sudden we had all this core development knowledge at the university," Cristoforo says. "But what happens when one of those wonderful students graduates?" So he worked with the university to establish a company that could offer long-term employment to Zhejiang graduates to work on State Street application development and maintenance. UniverseSoft Technology has gone on to help State Street deal with a whole host of legacy application issues—from high-end development to grunt work—in record time and at low costs.

Cristoforo refuses to call the relationship with Zhejiang "outsourcing." "When you're dealing with an outsourcing model, what you're doing tends to be more in the tactical interest of the company. When you're co-sourcing, it's more of a long-term relationship and it's in the strategic interest of a company," he says.

All for One and One for All

Like any outsourcing model, co-sourcing will work only if the client and vendor both get something out of the relationship, says CISR's

Ross. The vendor gets the benefit of developing industry- and application-specific skills by working on the client's project, while the client reaps the vendor's technology expertise at low costs. But a real co-sourcing alliance goes a step further, sharing project risk as well.

Guy de Poerck, CIO of the International Finance Corp. (IFC), an arm of the World Bank that promotes private-sector investment, views that concept of shared risk as critical to the application development and maintenance work it sends to its partners in India. IFC has been using Satyam Computer Systems for application development work for just 18 months, but it has quickly moved from paying for the work on a cost-and-materials basis to a fixed-cost model. Client and vendor decide ahead of time how much money will be spent on all application-related work.

To do so, de Poerck must be completely open with Satyam. He shares IFC's IT and business plans so that the outsourcer can determine what resources will be required to support IFC's ongoing projects. And Satyam must stick to the initial budget (unless the scope of a project changes) if it wants to profit from the relationship. "It's a true sharing of risk," says de Poerck. "You can't approach this like you're buying a commodity and saying, 'Here are my operations—do a survey and make me a deal.' With co-sourcing you have to engage with each other at a really detailed level."

But it wasn't easy for IFC to get to that point. De Poerck began

working with Satyam in early 2004 on a pilot project, paying for time and materials. But to truly share risk and management, de Poerck realized that his department would have to gain a better understanding of its processes than it had at the outset. "You need to know exactly what all your processes are and what your service levels are and have that documentation ready," says de Poerck. "Very often you will find that you don't. But co-sourcing is a fantastic way to force yourself to do that and raise the [service] level of your own IT department."

Another important ingredient in the co-sourcing equation is the level of trust and openness required. IFC insists on having "100 percent visibility" into who Satyam puts on its projects, says IFC's information officer and offshore manager, Zafar Azhar, who reports to de Poerck. One reason is that IFC has opened its network to Satyam. "We treat the development center at Satyam in Chennai the same way that we treat all of IFC's other 105 country offices around the world," says Azhar. "We do the same checks on [the employees] and ask for their passports, which starts a process to do background checks."

A major risk with co-sourcing alliances, according to Ross, is an imbalance of inputs between client and vendor. If a CIO

Align for Outsourcing Success

Co-sourcing alliances work when both sides are equally engaged

Co-Sourcing: Objectives



Co-Sourcing: What it is, the benefits and the risks

WHAT IS OUTSOURCED?	KEY METRICS	CLIENT RISKS	VENDOR RISKS	CLIENT SUCCESS RATE
Some, but not all, responsibility for project management and implementation	Overall project success	Vendor contribution can be difficult to assess	Transfer of project management expertise can undermine the client's need for outsourcing	63% of outsourcing clients said their co-sourcing alliances were successful

SOURCE: Survey and interviews conducted by Jeanne W. Ross and Cynthia Beath

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The Softer Side of Co-Sourcing

relies too much on the outsourcer's technical prowess, his staff may lack the knowledge to use the applications effectively. Conversely, if a vendor spends too much effort imparting its software development or project knowledge to the client, it could, in essence, share itself right out of a contract.

That Side's Yours and This Side's Mine

The mechanism for co-sourcing success—a true sense of partnership—can also be its downfall. Boundaries between the two sides can become blurred. It's often difficult to tell exactly what the client is contributing and what the vendor is providing, says Ross, and that can lead to problems. CIOs who succeed at these relationships seek to define the separate contributions of client and vendor—even down to individual responsibilities—without detracting from the collaborative nature of co-sourcing.

Omgeo, a software provider for the securities trading industry, began co-sourcing with Indian company Patni last year. The arrangement has worked so well that Omgeo Managing Director Michael Agnew refers to Patni as “the development, QA and testing unit” of Omgeo. Yet he has been careful to specify who does what. “It's part of our project charter process to set and write up all roles and responsibilities up front,” says Agnew. “We understand what all the accountabilities are by function, by project and by individual.” But simply saying who's responsible for what isn't enough. “The lesson I've learned with any partner is that being very formal in the communication process and setting expectations clearly up front is paramount to success,” says Agnew. “All throughout the project lifecycle, it should be clear who's handling what.”

At the highest level, there's an Omgeo global sourcing director who oversees all outsourcing and monitors all metrics from cost to performance to headcount. There are also Omgeo project managers who direct development teams and work with the vendor's project manager. Three Omgeo managers are responsible for working with Patni's quality assurance team in Mumbai. And most importantly, there's the Omgeo program manager for Patni who deals directly with Patni's equally important relationship manager for Omgeo.

Mary Lacity, professor of information systems at the University of Missouri, says having the right people in the relationship management roles is a make-or-break proposition for a co-sourcing alliance. “If you get the two primary point people right—the alliance managers for customer and supplier—you'll be fine,” she says. “It's hard to find the right people. But if those two people can be completely frank, be completely honest about the people in their own organization rather than necessarily protect them, and even share financial information—‘This is what my margins are, and this is what I can do’—then it works.”

Offshoring requires an awareness of cultural differences

Successful co-sourcing is all about client and vendor meeting each other halfway. And that goes beyond the exchange of technical skills and business knowledge. Communication and cultural awareness are also important, say CIOs.

State Street, which co-sources application development with UniverseSoft Technology in China, holds cultural and language classes for its Boston-based employees. “They learn things like how to address their Chinese counterparts, pronounce their names, et cetera,” says Jerry Cristoforo, CTO and executive VP of enterprise information and global markets technology services. “The problems that you usually think about with outsourcing—coding, policies, processes—are just the tip of the iceberg. The hidden parts are the values and the culture of the people involved. You have to be sensitive to that if [an outsourcing] program is to be successful.”

Michael Agnew, managing director of Omgeo, visits his co-sourcing partner in Mumbai twice a year and never arrives empty-handed. “I bring gifts to my partners. Even though I'm the customer, I take them out to dinner, which is not usually the way things work with clients and vendors,” he says. “They know we're happy customers and, knowing they're appreciated, they're inspired to perform. You have to treat your partner the way you would want to be treated.” —S.O.

How to Measure Success and Sustain Value

Certainly, a successful co-sourcing project is one that comes in on time and on budget and works well. But evaluating a co-sourcing relationship goes deeper than that.

For State Street's Cristoforo, project milestones are just the tip of the iceberg; a bigger issue is whether his co-sourcing arrangement can be sustained over the long haul. If specific issues arise during a project—say, problems with coding or processes—that's a signal to Cristoforo that a deeper problem could be lying underneath. “It really doesn't matter if you're making deliverables if you don't have sustainability,” he says. For Cristoforo, success in this kind of partnership can be measured only over a long period of time: “We've been working with Zhejiang close to five years. We've been with them as they've grown from 15 people supporting us to 300 people. They've proven they can handle all kinds of work, from high fidelity to low fidelity. We have many different development communities at State Street, and Zhejiang is now integrated with most of them.” These are all mounting signs of success for Cristoforo.

Back at TMA, Delman compares his co-sourcing alliance with Cordiant to another solid relationship he has. “I view it as a marriage. When something's really wrong, it's obvious. But when things are going well, you don't usually notice it. Sure, some days it's my birthday. And some days my daughter brings home a C to us. But normally things are pretty much like they were the day before,” Delman says. “It's the same way with my co-sourcing relationship. Sometimes I'm delightfully surprised. Sometimes I'm a little annoyed because I don't understand why some things take so long when others happen faster. But there's a certain rhythm to the relationship that I'm used to that tells me things are moving along.” **CIO**

Senior Editor Stephanie Overby (soverby@cio.com) covers outsourcing.

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FROM THE PUBLISHER

Certiably Sane

Not certifying IT workers' cross-platform knowledge borders on madness



Do you remember that childhood song "the knee bone's connected to the shin bone, the shin bone's connected to the foot bone"? I was thinking about that when I recently came across an April 1, 1999, column I penned in *CIO* that called for the mandatory certification of enterprise IT workers. I called the program the National Enterprise Software Certification program. Back then, I was worrying about Y2K.

Now I'm worried that we're in the early stages of a massive hardware, software and network infrastructure buildout, and I don't believe most tech workers have received adequate cross-technology training. Businesses and CIOs tend to segment their resources by technology, with some staff proficient in database software, others in e-business applications and so on. Current vendor-sponsored certification programs, though well-intentioned, support this silo structure.

But the future "dynamic enterprise" (as IDC research calls it) will be a real-time, burst-mode information engine built on the wheels of mobility, spanning new hardware architectures, both open and proprietary software systems and network technologies. Consequently, a small problem in the knee bone will cause a huge problem in the foot bone. Or the hip bone. Take your pick.

Hence my point: The time has come to augment vendor-sponsored certification with a mandatory, national program administered by state governments that would quantify the cross-platform knowledge of our nation's information technology workers.

I am therefore resurrecting my call for a National Enterprise Software Certification program. I see CIOs and vendors working together to build the key components of the program. This wouldn't be an academic exercise; it would be practical and practice-based.

Doctors, lawyers, dentists, truck drivers, pilots, teachers and cosmetologists must pass certification programs before they can serve the public. If we really believe IT is a foundation of our society, isn't it time to add IT workers to that list?

Am I certiably crazy to suggest such an idea? Should this idea be cut off at its knees? Or, might the industry consider it? Your certified publisher encourages you to share your thoughts with me at the e-mail address below.

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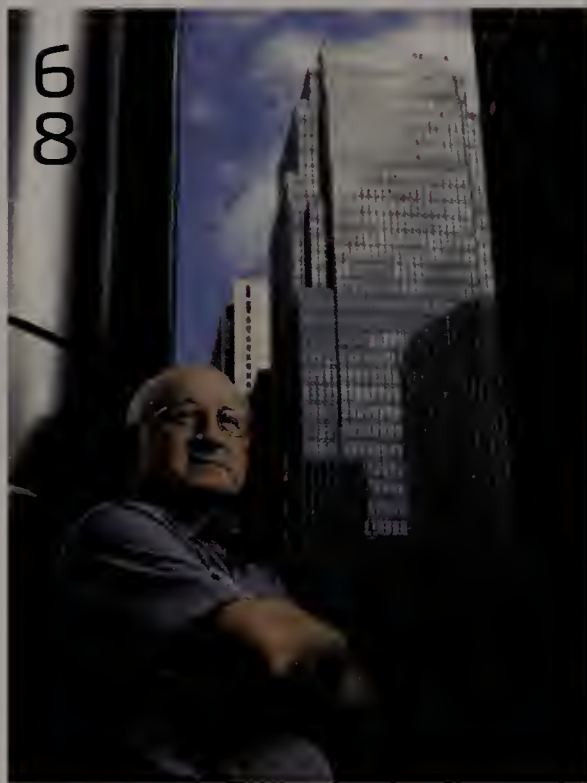


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CEO **Wayne Luthringshausen** of The Options Clearing Corp.: "My CIO's office is catty-corner to mine. We see each other every day. He would have to make a real effort to hide something from me."

68 | KEEPING UP WITH THE MERRILL LYNCHES

AS CEO of The Options Clearing Corp., which depends heavily on IT to clear options, futures, derivatives and other complex financial trades for its clients, Wayne Luthringshausen knows he can't stint on new technologies or costs. His company, after all, has to keep up with its most sophisticated clients, brokerage houses such as Merrill Lynch. A large part of Luthringshausen's job is to serve as an intermediary between IT and those clients. In this View from the Top interview, he tells *CIO* how he juggles that responsibility without taking over the CIO role.
By Ben Worthen

COVER STORY

52 | FIXING THE REQUIREMENTS MESS

ANALYSTS REPORT THAT as many as 71 percent of software projects that fail do so because of poor requirements management, making it the single biggest reason for project failure. Though CIOs are rarely directly responsible for requirements management, they are accountable for the outcomes, which can include project delays, software that does not do what it is supposed to do and, worst of all, software that may not work correctly when rolled out, putting the business—and the CIO's job—at risk. Some CIOs are rethinking requirements. One decided to simply enforce rules that should have been enforced all along. Another rewrote the rules from the ground up. And a pair threw out the old rule books completely, one taking a business-process-focused approach and the other focusing on building applications with quick iterations rather than long requirements documents. But they all say that you should pick a formal requirements-gathering process and stick to it. *By Christopher Lindquist*

63 | TESTING, 1, 2, 3...11

TESTING IS ESSENTIAL to developing high-quality software and to ensuring smooth business operations. It can't be given short shrift; the consequences are too dire. Businesses—and, in some cases, lives—are at risk when a company fails to adequately and effectively test software for bugs and performance issues, or to determine whether the software meets business requirements or end users' needs. Here we describe 11 best practices that will improve your software testing processes, ranging from colocating testers with developers to dedicating testers to specific applications and systems. *By Meridith Levinson*

74 | OFFSHORE ALLIES

MANY CIOs HAVE SENT application development and maintenance work offshore, hoping to save money while taking advantage of deep technical expertise in India and other outsourcing hot spots. But such arrangements fail 37 percent of the time, according to a recent study by MIT's Center for Information Systems Research (CISR) and *CIO*. One way to help offshoring deals succeed is to treat them as "co-sourcing alliances," in the study's terminology. This second article in a three-part series on the CISR-*CIO* research details the requirements for co-sourcing success: The client and vendor must both have strong capabilities, CIOs have to set expectations and governance processes for mutual benefit, and they should be ready to revisit those expectations and management rules to sustain co-sourcing value. *By Stephanie Overby*

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